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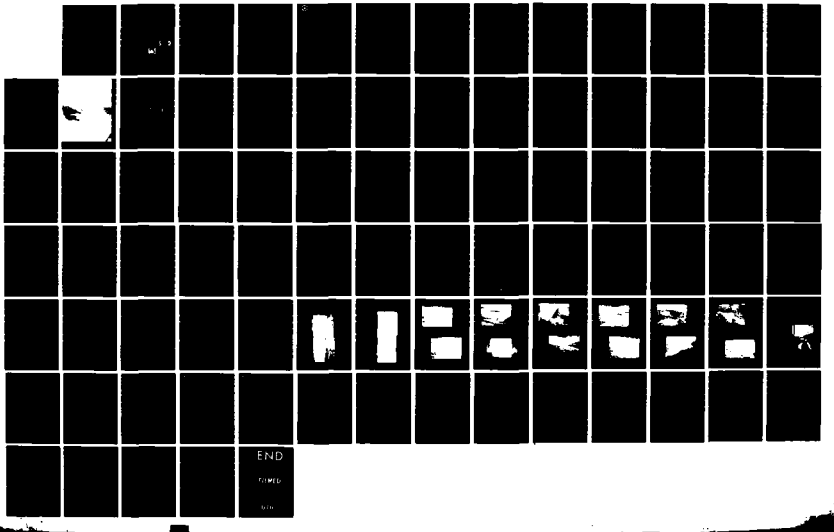

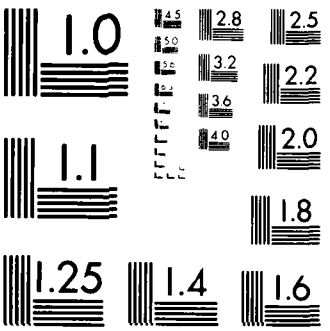

MICROCOPY RESOLUTION TEST CHART

MERRIMACK RIVER BASIN

WENTWORTH, NEW HAMPSHIRE

BAKER FLOODWATER RESERVOIR
SITE 11
NH 00478

NHWRB NO. 249.13

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

JULY 1979

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Merrimack River Basin
Wentworth, New Hampshire
Tributary to Baker River

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam is a 681 ft. long 24 ft. high earthen structure. The dam is judged to be in good condition. There were a few items noted during the inspection which require attention. It is small in size with a significant hazard potential There are no other recommendations resulting from the inspection.

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NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:
NEDED

JAN 17 1980

Honorable Hugh J. Gallen
Governor of the State of New Hampshire
State House
Concord, New Hampshire 03301

Dear Governor Gallen:

Inclosed is a copy of the Baker Floodwater Reservoir Site 11 Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Water Resources Board, the cooperating agency for the State of New Hampshire and the owner of the dam.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Water Resources Board for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

BAKER FLOODWATER RESERVOIR SITE 11

NH 00478

NHWRB 249.13

MERRIMACK RIVER BASIN
WENTWORTH, NEW HAMPSHIRE

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LETTER OF TRANSMITTAL

FROM THE CORPS OF ENGINEERS TO THE STATE

TO BE SUPPLIED BY THE CORPS OF ENGINEERS

NATIONAL DAM INSPECTION PROGRAM
PHASE I - INSPECTION REPORT
BRIEF ASSESSMENT

Identification No.:	00478
Name of Dam:	Baker Floodwater Reservoir Site 11
Town:	Wentworth
County and State:	Grafton, New Hampshire
Stream:	Tributary to Baker River
Date of Inspection:	May 17, 1979

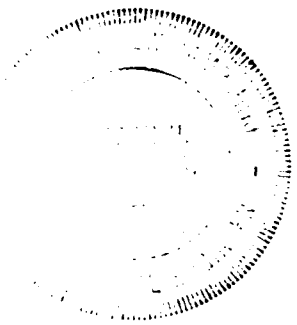
Baker Floodwater Reservoir Site 11 is a 681 foot long 24 foot high earthen structure. There are two different fill zones in the dam including a cut off wall. Top width of the dam is 12 feet. The upstream and downstream embankments are on a 3 horizontal to 1 vertical slope. Appurtenant structures consist of a principal spillway, plunge pool stilling basin, emergency spillway, and a 8 inch diameter gated pond drain. The principal spillway has two inlets, a low stage orifice and a high stage covered top spillway. The inlets discharge through the riser to a 2.5 foot diameter concrete pipe. The dam construction was completed in November of 1971. Plans, design calculations and construction data were prepared by the Soil Conservation Service and are available for inspection.

The visual inspection revealed that the dam is in good condition. Items noted during the inspection are staining and scaling of the concrete riser structure, log debris along the reservoir shoreline, and a large fallen tree in the downstream channel.

Based on the small size of the dam and its significant hazard classification and in accordance with Corps of Engineers guidelines, the test flood inflow should be of a magnitude between the 100 year frequency flood and 1/2 the Probable Maximum Flood (PMF). The test flood inflow used is equal to 1/2 the PMF or 825 cfs. The routed test flood outflow of 495 cfs does not overtop the dam as the capacity of the spillways is 607 cfs. There will be a freeboard of 0.4 feet. The design hydraulic calculations indicate that the principal spillway was designed for a 100 year frequency flood. The crest elevation of the dam was designed using a watershed runoff of 6.9 inches.

There are no recommendations resulting from the Phase I Inspection. Remedial measures include the development of a downstream warning system and removal of log debris from the reservoir and downstream channel, and removal of logs downstream of the emergency spillway.

The remedial measures are described in Section 7 and should be completed within two years of the receipt of this report by the owner.



Gordon H. Slaney, Jr., P.E.
Project Engineer

Howard, Needles, Tammen & Bergendoff
Boston, Massachusetts

This Phase I Inspection Report on Baker Floodwater Reservoir Site 11 has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

Joseph W. Finegan

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Joseph A. McElroy

JOSEPH A. MCELROY, CHAIRMAN
Chief, NED Materials Testing Lab.
Foundations & Materials Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report. it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there by any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedure

Baker Dam Site 11 is used for floodwater control. The normal pool level is maintained by the low stage orifice opening in the riser. Flood events of up to a 100 year frequency are retarded by the reservoir storage between the normal pool and the emergency spillway crest. The emergency spillway is utilized for events of greater then 100 year frequency.

4.2 Maintenance of Dam

The dam is inspected on an annual basis by the New Hampshire Water Resources Board and the Soil Conservation Service. Maintenance is undertaken as a result of the inspection on an as needed basis. The dam is visited on a regular monthly basis by personnel of the owner.

4.3 Maintenance of Operating Facilities

Maintenance of the outlet works is performed as in Section 4.2.

4.4 Description of Warning Systems

There are no warning systems in effect for this facility.

4.5 Evaluation

The current operation and maintenance procedure for this facility appear to be adequate to insure that any problems encountered can be remedied within a reasonable period of time. However, the owner should establish a warning system to follow in the event of emergency conditions.

The pond drain structure consists of a 8 inch diameter pipe and an intake with a trash rack. The drain discharges to the riser where it is gated with a 8 inch gate valve. The intake, pipe and valve could not be inspected as they were under water at the time of inspection. The operating mechanism located on top of the riser appeared to be in operational condition.

The 30 inch reinforced concrete discharge pipe, concrete cradle and supporting pier at the toe of the dam are in good condition as seen in Photos No. 12 & 13.

d. Reservoir Area. The area around the reservoir is mostly wooded. There are no cottages or dwellings along the shoreline. A roadway runs along the left bank of the reservoir. The shoreline is lined with many fallen trees.

e. Downstream Channel. Below the outlet works the channel has a natural rock strewn bed, with grassed banks. About 100 feet downstream of the dam the channel enters a wooded area. At this point there is a large fallen tree crossing the channel.

3.2 Evaluation

Visual examination indicates the dam is in good condition. Visual examination revealed the following:

(a) Some surface scaling and water staining on the concrete riser structure.

(b) Log debris along the reservoir banks.

(c) A large fallen tree across the downstream channel.

(d) Logs and fallen trees at the downstream end of the emergency spillway.

Downstream Slope

The downstream slope is 3 horizontal and 1 vertical and has an excellent grass cover as shown in Photo No. 4. The contact between the downstream slope and the abutments has been paved with riprap to prevent erosion. This riprap is in excellent condition.

No seepage or damp areas were observed on the downstream slope or below the toe of the dam.

The dam has a 4 foot wide trench drain near the downstream toe which is piped to the outlet stilling basin. A small amount of water was flowing from the 12 inch diameter drainpipe exiting on the left side of the outlet pipe.

c. Appurtenant Structures. The visual inspection of concrete riser spillway structure, auxiliary earth spillway and outlet works structure did not reveal any evidence of stability problems with respect to sliding and overturning.

The concrete surface of the riser structure generally appeared to be in good condition except for concrete water staining and some surface scaling see (Photo No. 7). The spillway trash racks are also in good condition; no rust or peeling of the protective coating was noted.

The principal spillway structure consists of three elements, an overflow control with low stage inlet and high stage spillway crest, a vertical transition and a closed discharge conduit. The riser structure is placed in the embankment. Visual inspection revealed that the riser structure appeared to be in good condition except for some surface mortar loss and water staining, see Photo No. 7.

The trash racks at the low and high stage inlets consist of standard shape angles and grating.

Both trash rack assemblies are in good condition.

The emergency earth spillway structure in Photos No. 8,9 & 10 is located at right abutment. The earth spillway is a relatively flat grassy area and is formed by the natural hill on the right side and the dam embankment to the left. The emergency spillway leads to downstream channel.

There are a few wet areas in the emergency spillway which are shown in Photo No. 10. Logs and fallen trees were seen at the downstream end of the emergency spillway.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The field inspection of Baker Dam Site 11 was made on May 17, 1979. The inspection team consisted of personnel from Howard, Needles, Tammen & Bergendoff and Geotechnical Engineers, Inc. A representative of the New Hampshire Water Resources Board was also present during the inspection. Inspection checklists, completed during the inspection, are included in Appendix A. At the time of inspection the water level was approximately 0.3 feet above the invert of the low stage inlet. The upstream face of the dam could only be inspected above this water level.

b. Dam. Visual inspection of the dam indicated that it is in good condition.

The dam, completed in 1971, is an earth embankment about 681 feet long and about 24 feet high. The embankment consists of two zones, a wide central core of silty fine to medium sand and upstream and downstream shells of sandy gravel. A cutoff trench 12 feet wide at its base extends below the axis of the dam into bedrock or an impervious silty till. A 4 foot wide drainage trench extends below the downstream shell at the base and the abutments of the dam.

An unpaved emergency spillway is cut into the right abutment passing around the embankment. An outlet works consisting of a concrete riser, 30-inch diameter concrete pipe passing through the dam, and a riprap lined stilling basin is located in line with the original stream channel.

Upstream Slope

The upstream slope is 3 horizontal to 1 vertical and has a 10 foot wide berm at about elevation 668, about 15 feet below the crest. The slope shown in Photo No. 2 is grass covered and in good condition.

Riprap placed around the intake structure was below the water level and could not be inspected.

Crest

The crest of the dam, which is shown in Photo No. 3, is 12 feet wide and has an excellent grass cover.

No misalignment of the crest was observed.

SECTION 2
ENGINEERING DATA

2.1 Design

A complete set of design data including layout, hydraulic design, foundation and embankment design, geology and soils reports, structural design, quanities and specifications are available for Baker Dam Site 11. In addition, there are construction drawings available. Design of the dam was done by the Soil Conservation Service, Durham, New Hampshire.

2.2 Construction

The dam construction was completed in November of 1971. A complete record of construction documents were made available. These documents include; as-built plans; job diaries, surveying records, test drilling logs, compaction test results, concrete tests and certificates of completion. Construction was by Robie Construction Co., Inc. and was inspected by the Soil Conservation Service, Durham, New Hampshire.

2.3 Operation

Normally the pond drain line gate is closed. The normal level of 667.0 is maintained by the low stage orifice openings. The principal spillway riser and reservoir storage is designed to retard runoff from up to a 100 year frequency storm without discharge occuring in the emergency spillway. (crest 680.5)

2.4 Evaluation

a. Availability. Engineering data available for Baker Dam Site 11 consists of the information outlined in Sections 2.1 and 2.2. The plans, design data, and construction records are available at the offices of the Soil Conservation Service, Federal Building, Durham, New Hampshire, 03824.

b. Adequacy. A complete set of design and construction data did allow for a definative review within the confines of this Phase I - Inspection Report. Therefore, the adequacy of this dam is based on the design and construction data reviewed, visual inspection, past performance history and sound engineering judgement.

c. Validity. The field inspection indicated that the external features of Baker Dam Site 11 substantially agree with those shown on the available plans.

Emergency Spillway

(1) Type - earth

(2) Length of Weir - 80 feet wide

(3) Crest Elevation - 680.5

(4) Gates - none

(5) U/S Channel - Approach channel from reservoir is 80 feet wide with 2½ to 1 side slopes

(6) Downstream Channel - Below the outlet works the channel has a natural rock strewn bed, with grassed banks. About 100 feet downstream of the dam the channel enters a wooded area. At this point there is a large fallen tree crossing the channel.

j. Regulating Outlets. The normal level of the reservoir is controlled by a 11.25 inch by 9 inch orifice inlet set in the riser at invert elevation 667.0. There is a trash rack for the opening but no control gate. The 8 inch pond drain pipe set at invert 657.5 extends 22 feet into the reservoir from the riser, and has a trash rack at the intake. The pipe is controlled at the riser by a gate.

f. Reservoir Surface (acres)

(1) Normal Pool - 2.8

(2) Flood Control Pool - 9.4

(3) Emergency Spillway Crest - 9.8

(4) Test Flood Pool - 13.0

(5) Top Dam - 13.0

g. Dam

(1) Type - earth

(2) Length - 681 feet

(3) Height - 24 feet hydraulic
30 feet structural

(4) Top Width - 12 feet

(5) Side Slopes - upstream and downstream 3 horizontal to 1 vertical

(6) Zoning - 2 fill zones

(7) Impervious core - none

(8) Cutoff - zone 1 fill

(9) Grout Curtain - none

(10) Other - none

h. Diversion and Regulating Tunnel

See Section j

i. Principal Spillway

(1) Type - concrete riser, covered top

(2) Length of Weir - total 15 feet

(3) Crest Elevation - 679.12

(4) Gates - Discharge pipe diameter is 2.5 feet

(5) U/S Channel - none

(2) There are no records available of maximum discharge at the site. However, during the inspection of the dam on May 17, 1979 it was noted that debris on the face of the dam reached to about elevation 675.4 which would correspond to a discharge of about 7 cfs.

(3) The spillway and riser capacity with the water surface at the top of the dam is approximately 607 cfs at elevation 683.5.

(4) Spillway and riser capacity with the water surface elevation at the test flood elevation of 683.1 feet is approximately 495 cfs.

(5) The total project discharge at the test flood elevation of 683.1 is 495 cfs.

c. Elevation (feet above MSL)

(1) Streambed at centerline of dam - 659.5

(2) Maximum tailwater - unknown

(3) Upstream portal invert pond drain - 657.5

(4) Normal pool - 667.0

(5) Full flood control pool - 680.0

(6) Spillway crest (riser crest) - 679.12
(emergency spillway) - 680.5

(7) Design surcharge - 680.0

(8) Top Dam - 683.5

(9) Test Flood Surcharge - 683.1

d. Reservoir (miles)

(1) Length of Maximum Pool - 0.35

(2) Length of Normal Pool - 0.1

(3) Length of Flood Control Pool - 0.2

e. Storage (gross acre-feet)

(1) Normal Pool - 8

(2) Flood Control Pool - 85

(3) Spillway Crest Pool - 90

(4) Top of Dam - 125

g. Purpose of Dam. This dam is used for floodwater control. The normal pool is maintained by the low stage intake in the riser. The storage between the low stage outlet and the emergency spillway crest is used for floodwater control for floods of up to a 100 year frequency.

h. Design and Construction History. The construction of this dam was completed in November of 1971. Design and construction inspection of this dam were done by the Soil Conservation Service, Durham, New Hampshire. The construction contractor was Robie Construction Company, Inc.

i. Normal Operating Procedures. The normal pool is maintained by the low stage inlet on the riser. Under flood conditions, when the capacity of the low stage orifice is exceeded, the storage is utilized. The high stage outlet will reach maximum design discharge before the reservoir reaches the crest of the emergency spillway. The dam does not require any manual operation in order to function.

1.3 Pertinent Data

a. Drainage Area. The area tributary to Baker Site consists of 0.55 square miles of mountainous terrain. There is no development in the watershed, which is within the White Mountain National Forest. Maximum elevation is at about 2060 feet MSL, and the dam crest elevation is 683.5 feet.

The area around the reservoir is mostly wooded. There are no cottages or dwellings along the shoreline. A roadway runs along the left bank of the reservoir. The reservoir bank is lined with many fallen trees.

b. Discharge of Dam Site

(1) Outlet works for Baker Dam Site 11 consist of an emergency spillway, a riser with a low stage orifice and a high stage covered top spillway, and an 8 inch pond drain pipe controlled by a gate. Invert of the pond drain is at elevation 657.5. Maximum discharge of the pipe when the reservoir is at the normal pool level of 667.0 is about 7 cfs. The low stage orifice has one opening 11.25 inches by 9 inches in size set at invert 667.0. Capacity of the low stage inlet when the reservoir is at the crest of the high stage inlet (679.12) is 9 cfs. The high stage covered inlet crest set at elevation 679.12 has a capacity of 99 cfs when the water level is at the emergency spillway crest of 680.5. The 50 foot wide emergency spillway has a crest at elevation 680.5. When the water surface is at the top of dam (elevation 683.5) the emergency spillway will have a capacity of 500 cfs.

b. Description of Dam and Appurtenances. Baker Site 11 Dam is an earthen embankment structure. Total length of the dam, according to existing drawings, is 681 feet. Maximum structural height is 30 feet, and the maximum height from the top of embankment to the streambed is 24 feet. According to the plans there are two different fill zones in the structure, which include a cut off wall. Top width of the dam is 12 feet and the embankment is on a 3 horizontal to 1 vertical slope both up and downstream.

Appurtenant structures consist of a concrete riser and pipe principal spillway with a covered top inlet. There are two stages to the inlet structure, a low stage orifice and a high stage covered inlet. The riser discharges through a 2.5 foot diameter concrete pipe and a plunge pool type stilling basin. The emergency spillway is located on the right side of the dam and has a width of 50 feet. A 8 inch diameter pond drain pipe can be opened from the riser structure by an 8 inch gate valve to lower the water level.

Figures 1 and 2, located in Appendix B, show a plan of the dam and appurtenant structures. Photographs of each structure are shown in Appendix C.

c. Size Classification. Small (hydraulic height - 24 feet, storage - 125 acre-feet) classification based on height being less than 40 feet, and storage being less than 1000 acre feet as given in *Recommended Guidelines for Safety Inspection of Dams*.

d. Hazard Classification. The potential for hazard posed by this dam is classified as significant. Failure of this dam at maximum pool elevation (top of dam) would result in a average flood wave about 15 feet high through the reach studied, extending to .5 miles downstream of the dam. Two dwellings and a commercial building in the reach would be flooded, and two roads would be overtopped.

e. Ownership. This dam is owned by the New Hampshire Water Resources Board, 37 Pleasant Street, Concord, New Hampshire.

f. Operator. This dam is maintained and operated by the New Hampshire Water Resources Board. Chairman of the Water Resources Board is Mr. George McGee, Sr.; Mr. Vernon Knowlton is Chief Engineer, Telephone No. 603/271-1110.

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
BAKER FLOODWATER RESERVOIR SITE 11

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Howard, Needles, Tammen & Bergendoff has been retained by the New England Division to inspect and report on selected dams in the State of New Hampshire Authorization and notice to proceed were issued to Howard, Needles, Tammen & Bergendoff under a letter of March 30, 1979 from John P. Chandler, Colonel, Corps of Engineers. Contract No. DACW33-79-C-0060 has been assigned by the Corps of Engineers for this work.

b. Purpose

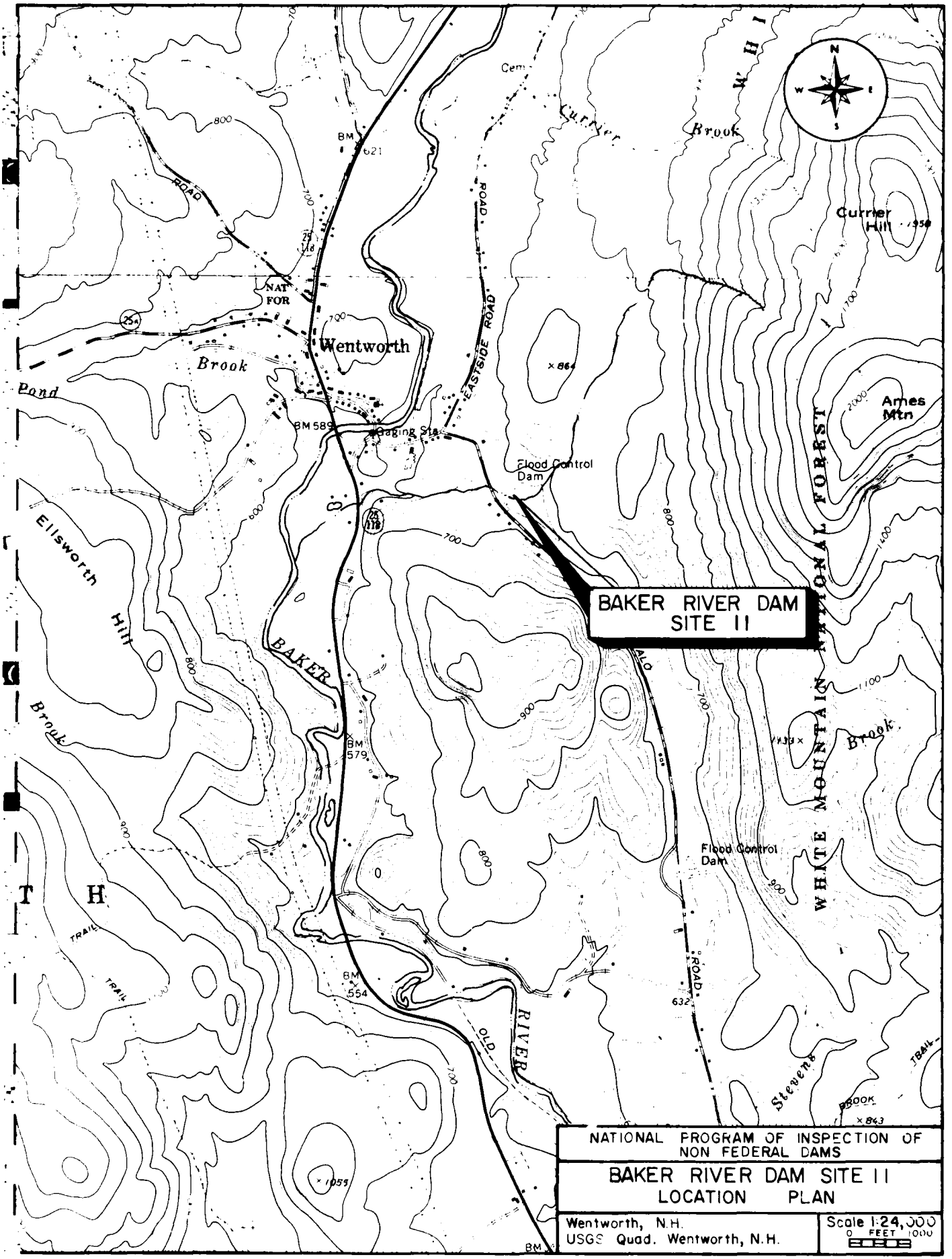
(1) To perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) To encourage and prepare the states to initiate quickly effective dam safety programs for non-Federal dams.

(3) To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location. Baker Floodwater Reservoir Site 11 (Baker Dam Site 11) is located on a tributary to the Baker River approximately 2500 feet upstream of Routes 25-118 in the Town of Wentworth, New Hampshire. The dam is shown on U.S.G.S. Quadrangle Wentworth, New Hampshire, with approximate coordinates N43°51'55" W71°54'00" Grafton County, New Hampshire. The location of Baker Dam Site 11 is shown on the preceeding page.



NATIONAL PROGRAM OF INSPECTION OF NON FEDERAL DAMS

BAKER RIVER DAM SITE II
LOCATION PLAN

Wentworth, N.H.
USGS Quad. Wentworth, N.H.

Scale 1:24,000
0 FEET 1000

SECTION 5
HYDROLOGY AND HYDRAULIC ANALYSIS

5.1 Evaluation of Features

a. General. Baker Dam Site 11 is an earthen embankment dam 681 feet long with a hydraulic height of 24 feet. The dam is constructed with two fill zones and a earth fill core. Appurtenant works consist of a two stage riser and a 2.5 foot diameter concrete pipe which discharges to a plunge pool type stilling basin. An emergency spillway 50 feet wide is located at the right abutment. There is an 8 inch diameter gated pond drain pipe, discharging to the riser structure.

b. Design Data. According to the Soil Conservation Service design data this dam is constructed to retard flood flows of a 100 year frequency storm without utilizing the emergency spillway. The design flood control elevation is 680.0 or 0.5 feet below the emergency spillway crest. Total runoff for this condition is 2.95 inches during a six hour Type IIB storm. The crest elevation of the dam was designed using a watershed runoff depth of 6.9 inches. The structure is classified as having a "B" hazard which is defined as being located in a predominantly rural and agricultural area, where failure may cause damage to isolated homes, main highways or railroads or cause interruption of use or service of relatively important public utilities.

c. Experience Data. There are no records available of maximum discharge at the dam site. However during the inspection of the dam on May 17, 1979 it was noted that debris on the face of the dam reached to about elevation 675.4 which would correspond to a discharge of about 7 cfs.

d. Visual Observations. No evidence of damage to any portion of the project from overtopping was visible at the time of inspection.

e. Test Flood Analysis. Detailed design data is available for this dam, and the basic conditions are noted above in Paragraph b. The hydrologic evaluation was preformed using information gathered by field investigation, watershed characteristics and Probable Maximum Flood (PMF) guide curves prepared by the Corps of Engineers. In accordance with Corps of Engineers guidelines, the significant hazard classification and small size of the dam warrant a test flood magnitude ranging from the 100 year frequency flood to 1/2 the PMF. A test flood of 1/2 the PMF was used as the hazard classification is on the higher end of the range with two buildings and two roadways affected. A test flood inflow of 825 cfs is based on a drainage area of 0.55 square miles in mountainous terrain.

The routed test flood outflow was determined in accordance with Corps of Engineers guidance for Estimating Effect of Surcharge Storage on Maximum Probable Discharge, and the hydraulic characteristics of the dam. Discharge through both the primary spillway and emergency spillway was considered. The routing was started with the water surface at the normal pool elevation. The routed test flood outflow was determined to be approximately 495 cfs. As the maximum capacity of the spillways is 607 cfs, there will be a freeboard of 0.4 feet.

f. Dam Failure Analysis. The impact of failure of the dam was assessed using the "Rule of Thumb" Guidance for Estimating Downstream Dam Failure Hydrographs prepared by the Corps of Engineers. The breach discharge was estimated with the water surface at the crest of the dam and a breach width equal to 40 percent of the total length of the dam. The downstream hydrograph is a sum of the breach discharge and the maximum spillway capacity. Prior to the breach of dam the downstream river stage would be about 9 feet the spillways at a full capacity of 607 cfs. Breach of dam would result in an additional 32,100 cfs for a total of about 32,700 cfs. The downstream flood stage was estimated through two reaches for a total distance of 0.5 miles from the dam to Route 25-118. The floodwave would be about 17 feet high at the dam and 12.8 feet at the Route 25-118 bridge. Near the bridge there are two dwellings set about 7 feet above the channel and one commercial building set about 6 feet above the streambed. All of these buildings are at least 200 feet from the main stream channel. In addition, Buffalo Road located just downstream of the dam and 6 feet above the streambed would be overtopped. Route 25-118 would also be overtopped as it is set 8.5 feet above the streambed.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations. The visual inspection of Baker Dam Site 11 did not disclose any immediate stability problems.

b. Design and Construction Data. Design drawings and construction specifications exist and indicate the dam is a zoned embankment consisting of a wide central core of silty fine to medium sand and downstream and upstream zones of sandy gravel. A cutoff trench extends below the central portion of the dam. The cutoff trench extends up both abutments. The upstream and downstream slopes are 3 horizontal and 1 vertical.

A drainage trench is located beneath the downstream zone of the embankment.

A grass-covered emergency spillway passes around the embankment of the right abutment.

A review of the construction data available indicates that the dam and appurtenant structures were constructed according to the plans and specifications.

c. Operating Records. There are no operating records available.

d. Post-Construction Changes. There is no record of post-construction changes.

e. Seismic Stability. The dam is located in Seismic Zone 2 and in accordance with the recommended Phase I guidelines does not warrant seismic analysis.

SECTION 7
ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. The visual inspection of Baker Floodwater Reservoir Site 11 indicates the dam is in good condition. The inspection revealed the following:

(1) Staining of concrete on the riser structure.

(2) A fallen tree across the channel downstream of the dam.

(3) Log debris along the shoreline of the reservoir.

(4) Logs and fallen trees at the downstream end of the emergency spillway.

The hydraulic analysis reveals that the spillways can pass the routed test flood without overtopping the dam.

b. Adequacy of Information. A complete set of design and construction data did allow for a definitive review with the confines of this Phase I - Inspection Report. Therefore, and Adequacy of this dam is based on the design and construction data reviewed, visual inspection, past performance history and sound engineering judgement.

c. Urgency. This dam is in generally good condition. The remedial measures described in Section 7.3 should be accomplished within two years after receipt of this Phase I Inspection Report.

d. Necessity of Additional Investigation. No additional investigation is needed to complete the Phase I inspection.

7.2 Recommendations

There are no recommendations resulting from the Phase I Inspection.

7.3 Remedial Measures

(a) Devise a warning system to follow in the event of emergency conditions.

(b) Remove the fallen tree from the downstream channel, and downstream of the emergency spillway.

(c) Remove fallen trees and logs, that may clog the trash racks, from the reservoir shorelines.

(d) Establish a system such that the reservoir level can be monitored during periods of intense rainfall.

(e) The periodic inspection should be continued on a biennial basis.

7.4 Alternatives

There are no practical alternatives to the remedial measures described in Section 7.3.

APPENDIX A

INSPECTION CHECKLIST

A-1

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT SITE 11, BAKER DAM

DATE May 17, 1979

TIME 11:00 AM

WEATHER Fair

W.S. ELEV. 667.3 U.S. - DN.S

PARTY:

1.	G. Slaney	HNTB	
2.	S. Mazur	HNTB	
3.	D. LaGatta	GEI	
4.	C. Osgood	GEI	
5.			
6.			
7.			
8.			
9.			
10.			

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Dam	D. LaGatta, C. Osgood	
2.	Spillway, Outlet Works	S. Mazur	
3.	and Downstream Channel	G. Slaney	
4.			
5.			
6.			
7.			
8.			
9.			
10.			

PERIODIC INSPECTION CHECK LIST

PROJECT BAKER SITE NO 11 DAM DATE May 17, 1979

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	683.5
Current Pool Elevation	667.3
Maximum Impoundment to Date	675.4 estimated from debris level
Surface Cracks	None observed
Pavement Condition	No pavement, grass cover good
Movement or Settlement of Crest	None apparent
Lateral Movement	None apparent
Vertical Alignment	No misalignment observed
Horizontal Alignment	No misalignment observed
Condition at Abutment and at Concrete Structures	Good condition
Indications of Movement of Structural Items on Slopes	No structural items on slopes
Trespassing on Slopes	No damage due to treaspass on slopes
Sloughing or Erosion of Slopes or Abutments	None observed
Rock Slope Protection - Riprap Failures	None observed
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	None observed
Piping or Boils	None observed
Foundation Drainage Features	12" drains clear, small amount of water exiting from left drain
Toe Drains	Brush beginning to grow on riprap gutter
Instrumentation System	None
Vegetation	Grass cover

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 11, BAKER DAM DATE May 17, 1979

PROJECT FEATURE Intake Channel/Structure NAME D. LaGatta, C. Osgood

DISCIPLINE Geotechnical/Structural NAME S. Mazur

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	No approach channel visible but rip-rap for 12' on reservoir slope adjacent to intake structure.
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	None
Debris	None
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	Galvanized trash rack and concrete surface of riser structure at high and low stages of inlet are in good condition. Bottom water release structure was under water.
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 11, BAKER DAM DATE May 17, 1979

PROJECT FEATURE Control Tower NAME G. Slaney

DISCIPLINE Structural/Hydraulic Engineers NAME S. Mazur

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	Bottom water release structure (outlet works) consists of inlet structure and 12" I.D. cast iron pipe extended to riser structure. Outlet works structure and control gate were under water.
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	Mechanically operated gate and control mechanism are housed in concrete riser tower structure. Gate is operated from roof of riser structure. Gate and control mechanism appear to be in good operational condition.
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 11, BAKER DAM

DATE May 16, 1979

PROJECT FEATURE Spillway/Outlet Works Conduit

NAME G. Slaney

DISCIPLINE Structural/Hydraulic Engs.

NAME S. Mazur

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	At the time of inspection outlet works conduits were under water. Riser discharge channel consists of 30" I.D. reinforced concrete pipe which is placed on concrete bedding. Discharge conduit appears to be in good condition.
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 11, BAKER DAM — DATE May 16, 1979

PROJECT FEATURE Outlet Structure/Channel — NAME D. LaGatta, C. Osgood

DISCIPLINE Structural/Hydraulic/Geotechnical — NAME S. Mazur, G. Slaney

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Concrete outlet works pipe and concrete support bedding are in good condition. Some water staining.
Rust or Staining	None
Spalling	None
Erosion or Cavitation	None
Visible Reinforcing	None
Any Seepage or Efflorescence	Good
Condition at Joints	None
Drain Holes	Rocky streambed
Channel	Stream enters woods 50' from discharge pipe
Loose Rock or Trees Overhanging Channel	unobstructed
Condition of Discharge Channel	

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 11, BAKER DAM — DATE May 16, 1979

PROJECT FEATURE Outlet Works/Spillway — NAME D. LaGatta, C. Osgood

DISCIPLINE Structural/Hydraulic/Geotechnical — NAME S. Mazur, G. Slaney

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Good condition
General Condition	None
Loose Rock Overhanding Channel	None
Trees Overhanging Channel	Grass cover with bedrock outcrops and wet areas along central floor.
Floor of Approach Channel	
b. Weir and Training Walls	This facility has two spillway structures concrete riser with two inlets and auxiliary earth spillway located ar right abutment. Both spillways are in good condition.
General Condition of Concrete	
Rust or Staining	Water Staining
Spalling	Some surface scaling
Any Visible Reinforcing	None
Any Seepage or Efflorescence	None
Drain Holes	None
c. Discharge Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Channel	Grass covered-some wet area channel ends abruptly at edge of 2nd growth woods
Other Obstructions	

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 11, BAKER DAM DATE May 16, 1979

PROJECT FEATURE Service Bridge NAME

DISCIPLINE NAME

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	This facility has no service bridge.
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

(Facility) CIRCLE J RENT

Concrete: Inside and out	Cracking 1; Spalling 1; Other deterioration 1; Excessive movement (check joints) 1; Waterstops ___; Joint sealant ___; Other ___.
Trashracks: Low and high stage	Condition of protective coatings ___; Corrosion ___; Damaged parts ___; Condition of fastenings ___; Need of gratings due to beaver ___; Safety condition (protruding fastenings, sharp edges, etc.) ___; Other ___.
Gates: Including lifting device, stem, guides, disc, flap	Condition of protective coating ___; Corrosion ___; Damaged parts ___; Condition of fastenings ___; Stem alignment ___; Operation ___; Lubrication ___; Wood decay ___; Other ___.
Structure Drainage:	Report under "Embankment and Other Drains"
Structure, Railing, Rails, Barriers, etc.	Condition of protective coating ___; Corrosion ___; Damaged parts ___; Condition of Fastenings ___; Wood decay ___; Safety condition (protruding fastenings, sharp edges, etc.) ___; Other ___.
Safety Items:	Condition of warning signs ___; Condition of safety equipment ___; Other ___.

COMMENTS _____

3. CHANNEL

Stream obstructions.	3
Debris in stream.	5
Sediment bars controlled.	1
Plunge pool stability.	1
Fish habitat appurtenances	___

Riprap -- Report under "Riprap" (item 4)

COMMENTS ROCK RIPRAP HAS BEEN MOVED DOWNSTREAM.

RISER

Caution Be extremely careful when using ladders. Check condition before using. Ladders are sometimes broken, loose, corroded, and or slippery.
Use safety harness.

adders: inside and out — Condition of protective coating___; Corrosion___; Damaged parts___; Loose___; Other___.

oncrete: inside and out — Cracking___; Spalling___; Other deterioration 2; Excessive movement (check joint at riser and conduit)___; Other___.

rashracks: low and high stage — Condition of protective coatings___; Corrosion ___; Damaged parts___; Condition of fastenings ___; Need of gratings due to beaver___; Safety condition (protruding fastenings, sharp edges, etc.)___; Other___.

anhole: — Condition of protective coatings___; Corrosion ___; Damage___; Lock operable___; Other___.

ate: including lifting device, stem, guides, disc — Condition of protective coating___; Corrosion ___; Damaged parts___; Condition of fastenings___; Stem alignment___; Lubrication___; Operation___; Other___.

afety Items: — Condition of warning signs___; Condition of safety equipment___; Other___.

OMMENTS WRD PERSONNEL WILL CHECK RISER & APPURTENANCES AT LATER DATE. SACK RUB COAT SCALING OFF IN ONE SPOT

EGETATION

	Dam	Emergency Spillways left	Emergency Spillways right 1/	Dike	Outlet Channel	Water way	Other (_____)
ondition of stand (including need for lime and fertilizer)	1	—	1	—	NA	—	—
ndesirable vegetation	3	—	2	—	1	—	—
rainage (surface)	NA	—	2	—	NA	—	—
rosion 2/	1	—	1	—	1	—	—
edimentation	1	—	1	—	1	—	—
ondition of planting	NA	—	—	—	—	—	—
est control	—	—	—	—	—	—	—
ire control	—	—	—	—	—	—	—

OMMENTS RUSHES AROUND OUTLET PIPE SHOULD BE REMOVED

EMBANKMENT, STRUCTURAL, & OTHER DRAINS

		Dam left	Dam right 1/	Other (____)	Other (____)
Depth of Flow (in inches above invert)	With any obstruction	—	—	—	—
	Without any obstruction	0	0	—	—
Turbidity of Discharge (yes, no)	With any obstruction	—	—	—	—
	Without any obstruction	NO	NO	—	—
Condition of Protective Coating	Outside	1	1	—	—
	Inside	1	1	—	—
Obstruction in Flow (yes, no)		NO	NO	—	—
Animal Guard Condition		1	1	—	—
Outlet Condition		1	1	—	—

Retarding Pool Elevation (ft. msl)_____ or_____(ft.) above / below _____

Other_____

COMMENTS_____

king downstream.
luding wave, surface, stream, manmade, and livestock erosion.

EMBANKMENT AND EXCAVATED SLOPES

(Report riprap and vegetation and erosion condition under Items 4 and 5.)

	Dam	Dike	Emergency Spillways left	Emergency Spillways right 1/	Other (____)	Other (____)
Sliding or sloughing	/	—	—	—	—	—
Holes (rodent and other) (check especially at embankments)	/	—	—	—	—	—
Excessive settlement (embankments)	/	—	—	—	—	—
Cracks						
Traverse	/	—	—	—	—	—
Longitudinal	/	—	—	—	—	—
Seepage 2/	/	—	—	—	—	—
Piping 2/	/	—	—	—	—	—

COMMENTS _____

RIPRAP

	Displ. of Rock	Loss of Spalls	Loss of Bedding	Erosion of Found.	Breakdown of Rock
Dam					
Upstream berm	—	—	—	—	—
Principal Spillway Outlet	—	—	—	—	—
Embankment Gutters					
left DOWNSTM	/	/	/	/	/
right DOWNSTM	/	/	/	/	/
Emergency Spillway					
location _____	—	—	—	—	—
location _____	—	—	—	—	—
Waterways					
location _____	—	—	—	—	—
location _____	—	—	—	—	—
Outlet Channel	3	3	/	/	/
Other _____	—	—	—	—	—

COMMENTS RIPRAP AT OUTLET END OF PLUNGE POOL NEEDS REPAIR

ooking downstream.
heck especially at downstream face of embankments.

EMBANKMENT AND EXCAVATED SLOPES

(Report riprap and vegetation and erosion condition under Items 4 and 5.)

	Dam	Dike	Emergency Spillways left	Emergency Spillways right 1/	Other (____)	Other (____)
Sliding or sloughing	/	—	—	—	—	—
Holes (rodent and other) (check especially at embankments)	/	—	—	—	—	—
Excessive settlement (embankments)	/	—	—	—	—	—
Cracks						
Traverse	/	—	—	—	—	—
Longitudinal	/	—	—	—	—	—
Seepage 2/	/	—	—	—	—	—
Piping 2/	/	—	—	—	—	—

COMMENTS _____

RIPRAP

	Displ. of Rock	Loss of Spalls	Loss of Bedding	Erosion of Found.	Breakdown of Rock
Dam					
Upstream berm	—	—	—	—	—
Principal Spillway Outlet	—	—	—	—	—
Embankment Gutters					
left DOWNSTM	/	/	/	/	/
right DOWNSTM	/	/	/	/	/
Emergency Spillway					
location _____	—	—	—	—	—
location _____	—	—	—	—	—
Waterways					
location _____	—	—	—	—	—
location _____	—	—	—	—	—
Outlet Channel	3	3	/	/	/
Other _____	—	—	—	—	—

COMMENTS RIPRAP AT OUTLET END OF PLUNGE POOL NEEDS REPAIR

1/ Looking downstream.
2/ Check especially at downstream face of embankments.

MAINTENANCE CHECKLIST FOR PL 566 FLOOD CONTROL STRUCTURES

This maintenance checklist is a guide for determining the maintenance required for Public Law 566 flood control structures in New Hampshire. It doesn't take the place of experience and judgment and is not inclusive. Items of a difficult nature to check, such as principal spillway conduit condition, are not included. Intensive checks of these items are necessary at proper intervals. Review of as-built drawings, the design folder, structure history, and previous maintenance reports should be part of the inspection. Prompt maintenance is a vital part of safe and effective operation.

Except where otherwise indicated, completion of this form may be facilitated by ranking maintenance items on a 1 to 4 basis where

1 = satisfactory
2 = satisfactory, but check carefully at next inspection
3 = requires maintenance this season
4 = requires immediate attention.

WATERSHED BAKER RIVER SITE 11 DATE 5-20-77

INSPECTED BY REAR MILLIGAN, DINNEEN GILSEN, LUNTALA MACPHERSON

1. GENERAL ITEMS

Access Road.	1
Site Fencing.	1
Traffic Conditions.	2
Vandalism Control.	1
Trash Control.	1

COMMENTS OLD WHEEL RUTS IN LEVEL SECTION OF EM. SPILLWAY

RESERVOIR

Timber stand at reservoir.	2
Debris and slash.	2
Sediment level in relation to low stage inlet	

COMMENTS BLOW DOWNS ARDUND EDGE OF PERMANENT POOL.

IMPACT BASIN, SAF, BOX INLET, & MISCELLANEOUS CONCRETE STRUCTURES

(specify)_____ _____

N/A

Concrete: inside and out	Cracking___; Spalling___; Other deterioration ___; Excessive movement (check joints)___; Waterstops___; Joint sealant___; Other___.
Trashracks: low and high stage	Condition of protective coatings___; Corrosion ___; Damaged parts___; Condition of fastenings___; Need of gratings due to beaver___; Safety condition (protruding fastenings, sharp edges, etc.)___; Other___.
Gates: including lifting device, stem, guides, disc, flap	Condition of protective coating___; Corrosion ___; Damaged parts___; Condition of fastenings___; Stem alignment___; Operation___; Lubrication___; Wood decay___; Other___.
Structure Drainage:	Report under "Embankment and Other Drains"
Structure, Railing, Grates, Barriers, etc.	Condition of protective coating___; Corrosion ___; Damaged parts___; Condition of Fastenings___; Wood decay___; Safety condition (protruding fastenings, sharp edges, etc.) ____; Other___.
Safety Items:	Condition of warning signs___; Condition of safety equipment___; Other___.

COMMENTS_____

CHANNEL

Stream obstructions.	1
Debris in stream.	1
Sediment bars controlled.	1
Plunge pool stability.	1
Fish habitat appurtenances	NA

Riprap -- Report under "Riprap" (item 4)

COMMENTS_____

7. RISER

Caution Be extremely careful when using ladders. Check condition before using. Ladders are sometimes broken, loose, corroded, and or slippery.
Use safety harness.

Ladders: inside and out	Condition of protective coating___; Corrosion___; Damaged parts___; Loose___; Other___.
Concrete: inside and out	Cracking 1; Spalling 1; Other deterioration 1; Excessive movement (check joint at riser and conduit)___; Other___.
Trashracks: low and high stage	Condition of protective coatings___; Corrosion 1; Damaged parts 1; Condition of fastenings 1; Need of gratings due to beaver___; Safety condition (protruding fastenings, sharp edges, etc.)___; Other___.
Manhole:	Condition of protective coatings___; Corrosion ___; Damage___; Lock operable___; Other___.
Gate: including lifting device, stem, guides, disc	Condition of protective coating___; Corrosion ___; Damaged parts___; Condition of fastenings___; Stem alignment___; Lubrication___; Operation___; Other___.
Safety Items:	Condition of warning signs___; Condition of safety equipment___; Other___.

COMMENTS Did not go down riser. Suggest interior of riser and gate operation be checked at suitable intervals.

5. VEGETATION

	Dam	Emergency Spillways left	Emergency Spillways right 1/	Dike	Outlet Channel	Water way	Other (_____)
Condition of stand (including need for lime and fertilizer)	___	1	1	___	___	___	___
Undesirable vegetation	___	___	___	___	___	___	___
Drainage (surface)	___	___	___	___	___	___	___
Erosion 2/	___	___	___	___	___	___	___
Sedimentation	___	___	___	___	___	___	___
Condition of planting	___	___	___	___	___	___	___
Pest control	___	___	___	___	___	___	___
Fire control	___	___	___	___	___	___	___

COMMENTS Some small brush on downstream side of dam. Generally looks good. Emergency spillway - wet, reverting to aquatic vegetation.

6. EMBANKMENT, STRUCTURAL, & OTHER DRAINS

		Dam left	Dam right 1/	Other (_____)	Other (_____)
Depth of Flow (in inches above invert)	With any obstruction	½"	none	___	___
	Without any obstruction	___	___	___	___
Turbidity of Discharge (yes, no)	With any obstruction	___	___	___	___
	Without any obstruction	no	no	___	___
Condition of Protective Coating	Outside	1	1	___	___
	Inside	1	1	___	___
Obstruction in Flow (yes, no)		no	no	___	___
Animal Guard Condition		1	1	___	___
Outlet Condition		1	1	___	___

Retarding Pool Elevation (ft. msl)_____ or ≈ 4 in. (~~ft~~) above ~~below~~ L.S.

Other_____

COMMENTS

1/Looking downstream.
2/Including wave, surface, stream, manmade, and livestock erosion.

3. EMBANKMENT AND EXCAVATED SLOPES

(Report riprap and vegetation and erosion condition under Items 4 and 5.)

	Dam	Dike	Emergency Spillways left	Emergency Spillways right 1/	Other (____)	Other (____)
Sliding or sloughing	1	—	—	1	—	—
Holes (rodent and other) (check especially at embankments)	1	—	—	1	—	—
Excessive settlement (embankments)	1	—	—	—	—	—
Cracks						
Traverse	1	—	—	1	—	—
Longitudinal	1	—	—	1	—	—
Seepage 2/	1	—	—	1	—	—
Piping 2/	1	—	—	1	—	—

COMMENTS _____

4. RIPRAP

	Displ. of Rock	Loss of Spalls	Loss of Bedding	Erosion of Found.	Break-down of Rock
Dam					
Upstream berm	1	1	1	1	1
Principal Spillway Outlet	3	1	1	1	1
Embankment Gutters					
left downstream	1	1	1	1	1
right downstream	1	1	1	1	1
Emergency Spillway					
location _____	—	—	—	—	—
location _____	—	—	—	—	—
Waterways					
location _____	—	—	—	—	—
location _____	—	—	—	—	—
Outlet Channel	—	—	—	—	—
Other _____	—	—	—	—	—

COMMENTS Two or three pieces of riprap at downstream outlet of plunge pool should be removed.

1/ Looking downstream.
2/ Check especially at downstream face of embankments.

MAINTENANCE CHECKLIST FOR PL 566 FLOOD CONTROL STRUCTURES

This maintenance checklist is a guide for determining the maintenance required for Public Law 566 flood control structures in New Hampshire. It doesn't take the place of experience and judgment and is not inclusive. Items of a difficult nature to check, such as principal spillway conduit condition, are not included. Intensive checks of these items are necessary at proper intervals. Review of As Built drawings, the design folder, structure history, and previous maintenance reports should be part of the inspection. Prompt maintenance is a vital part of safe and effective operation.

Except where otherwise indicated, completion of this form may be facilitated by ranking maintenance items on a 1 to 4 basis where

1 = satisfactory
2 = satisfactory, but check carefully at next inspection
3 = requires maintenance this season
4 = requires immediate attention.

209.12

WATERSHED Baker SITE 11 DATE 6-13-78

INSPECTED BY Garv Kerr, Lvall Milligan (WRB); Mike Dannehy, Nick Luhtala, Ray Wenninger (SCS)

1. GENERAL ITEMS

Access Road.	N/A
Site Fencing.	N/A
Traffic Conditions.	N/A
Vandalism Control.	1
Trash Control.	1

COMMENTS No trash, looks good.

2. RESERVOIR

Timber stand at reservoir.	1
Debris and slash.	1
Sediment level in relation to low stage inlet	1

COMMENTS

SOIL CONSERVATION SERVICE
US DEPARTMENT OF AGRICULTURE

PAST INSPECTION REPORTS

AVAILABLE ENGINEERING DATA

1. A set of drawings (24 sheets), dated November 1970, showing plans and details of the dam and appurtenant structures.

2. Design Data: including layout, hydraulic design, geology and soils reports, structural design, quanities and specifications.

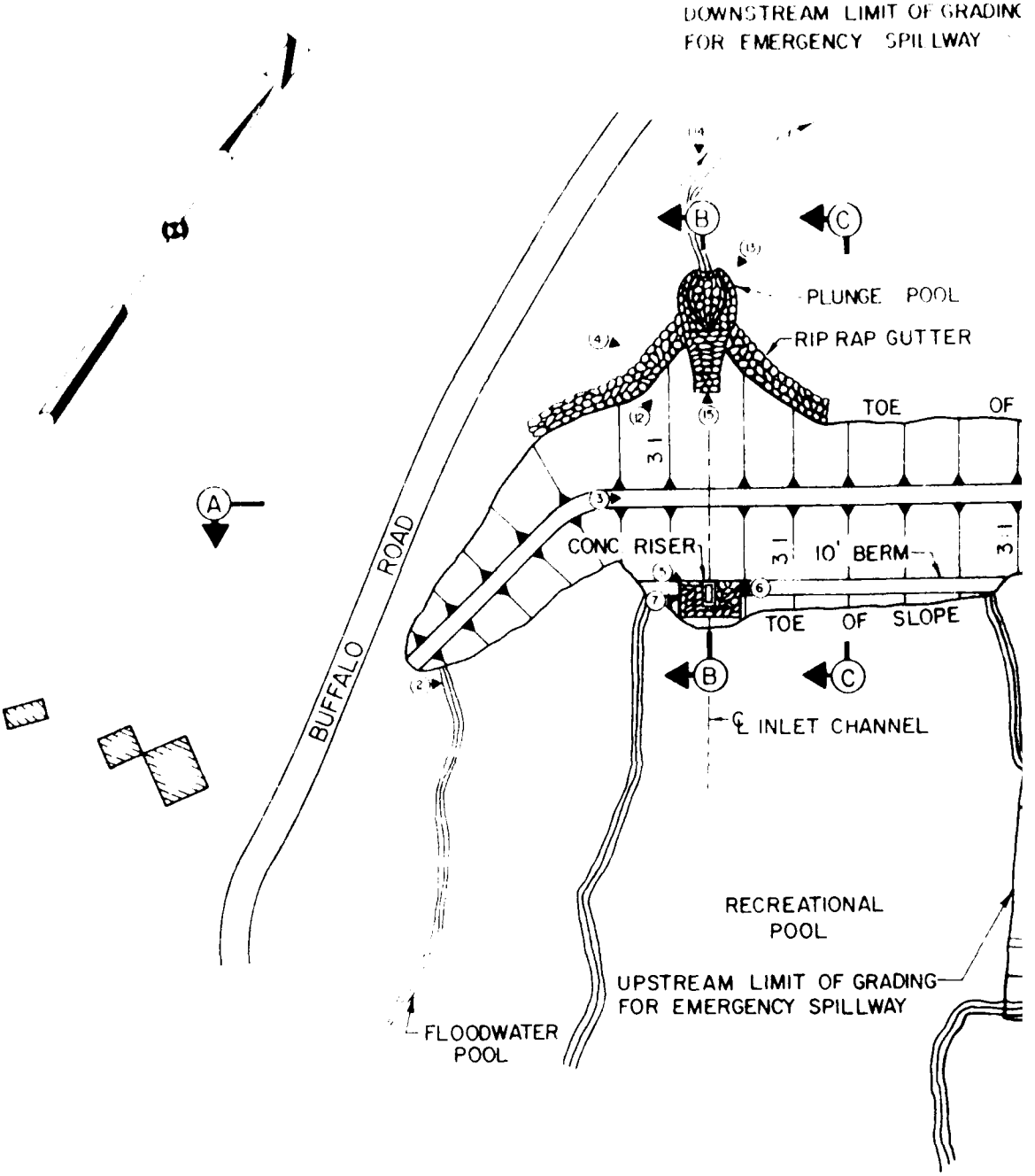
3. Construction Data: including as-built plans, job diarys, surveying records, test drilling logs, compaction test results, concrete tests, and certificate of completion.

All of the above are on file with the U.S.D.A. Soil Conservation Service, Federal Building, Durham, N.H. 03824.

APPENDIX B

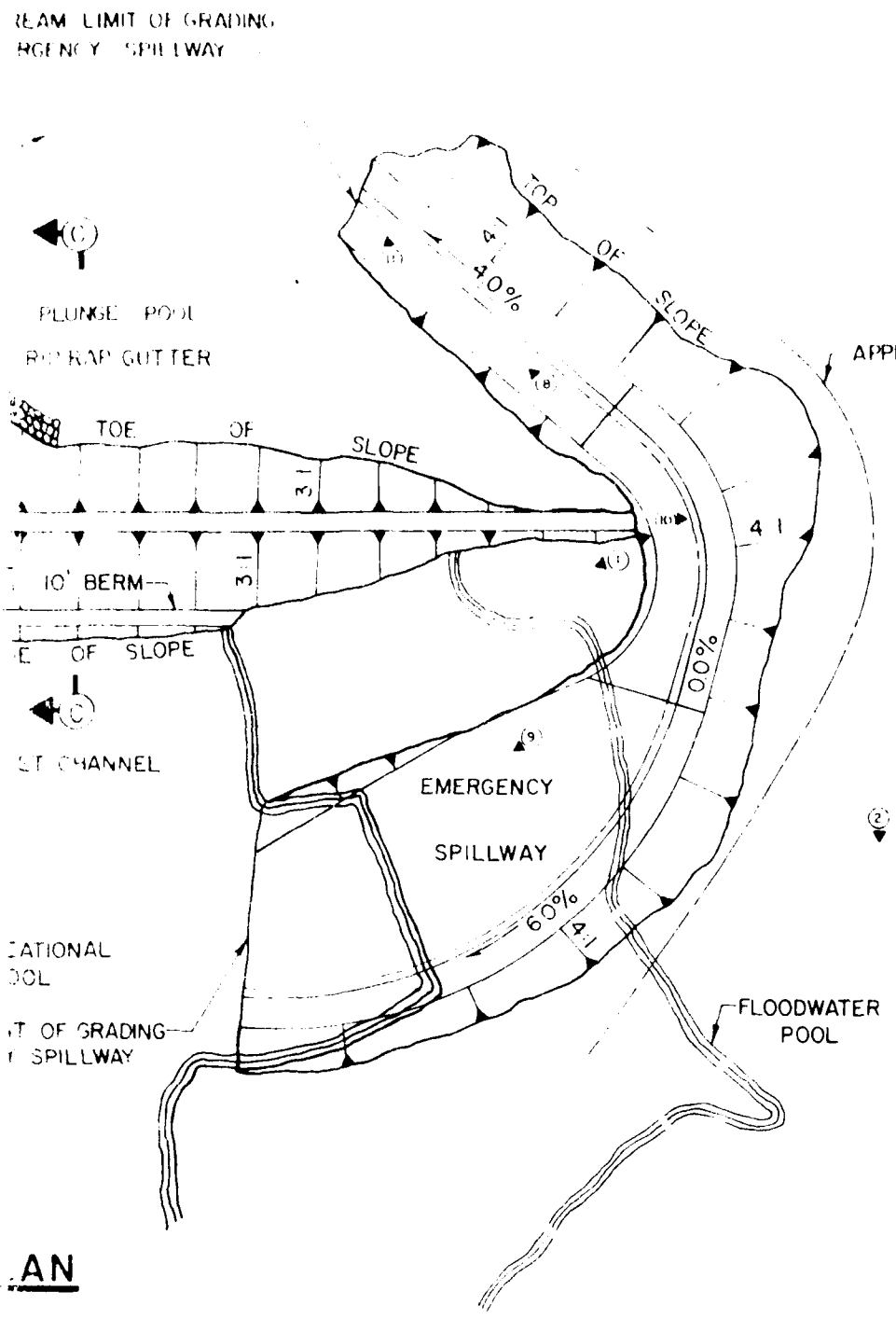
ENGINEERING DATA

1. LIST OF DESIGN, CONSTRUCTION AND MAINTENANCE RECORDS
2. PAST INSPECTION REPORTS
3. PLAN AND DETAILS



PLAN

FIG 1



AN

1. THE INFORMATION SHOWN ON THESE DRAWINGS IS BASED ON THE ORIGINAL CONSTRUCTION PLANS AND VISUAL OBSERVATIONS MADE DURING THE FIELD INSPECTION. DIMENSIONS OR MATERIALS INDICATED ON THESE DRAWINGS WHICH WERE BELOW GRADE OR WATER DURING THE TIME OF INSPECTION WERE NOT VERIFIED.

2. THE ELEVATIONS SHOWN ARE 1929 M.S.L. DATUM

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

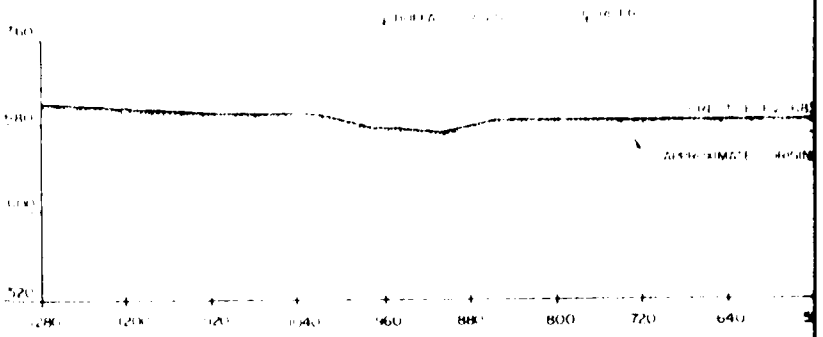
SITE NO. 11
BAKER FLOODWATER RESERVOIR

TRIBUTARY TO BAKER RIVER

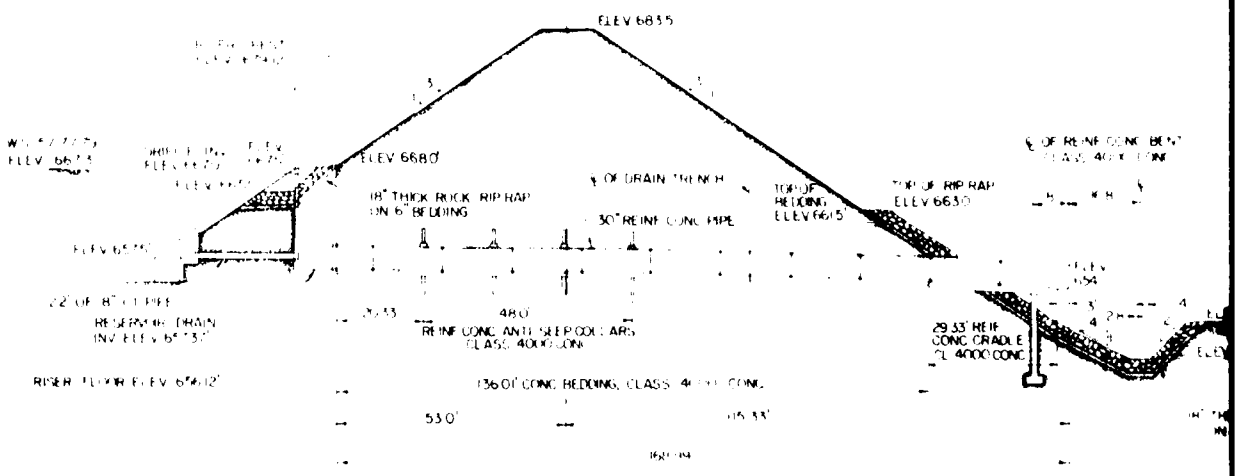
WENTWORTH, N.H.

Figure 1 of 2

2 of 2



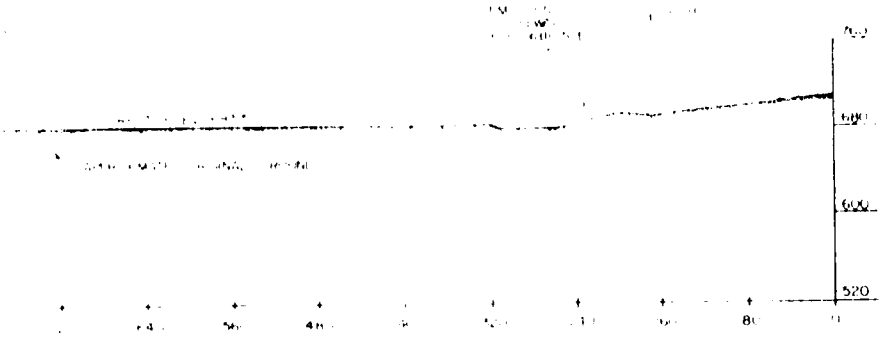
SECTION A-



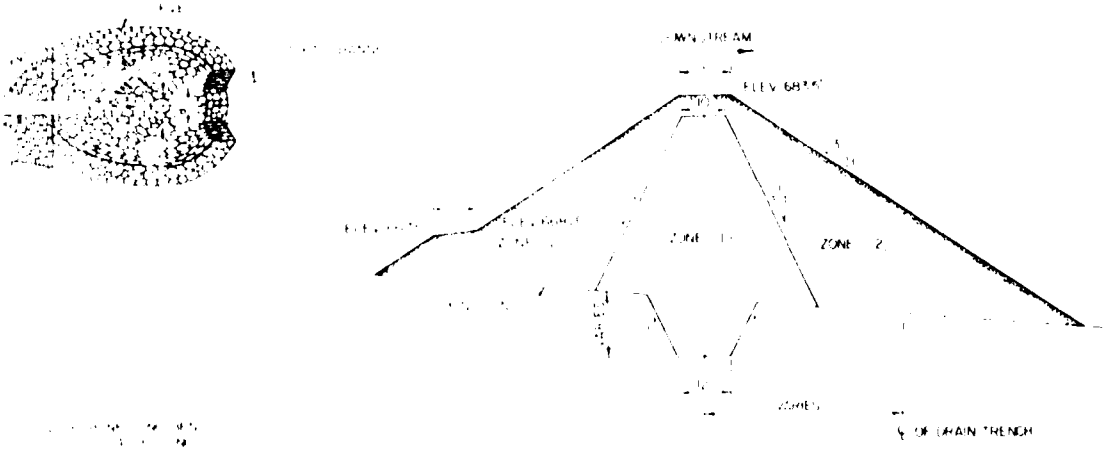
SECTION B-B

FIG. 2

1 of 2



SECTION A-A



SECTION C-C

1. THE INFORMATION SHOWN ON THESE DRAWINGS IS BASED ON THE ORIGINAL CONSTRUCTION PLANS AND VISUAL OBSERVATIONS MADE DURING THE FIELD INSPECTION. DIMENSIONS OR MATERIALS INDICATED ON THESE DRAWINGS WHICH WERE BELOW GRADE OR WATER DURING THE TIME OF INSPECTION WERE NOT VERIFIED.

2. THE ELEVATIONS SHOWN ARE 1929 M.S.L. DATUM

EARTH FILL REQUIREMENTS

WATER CONTENT	COMPACTION
PERCENT	DEGREE OF COMPACTION
MINIMUM	95% MAXIMUM DENSITY BY ASTM D698 METHOD A
WET OF OPTIMUM	FREE FROM ORGANIC MATTER

NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS

SITE NO. 11
BAKER FLOODWATER RESERVOIR

TRIBUTARY TO BAKER RIVER

Figure 2 of 2

2 of 2

APPENDIX C

PHOTOGRAPHS

FOR LOCATION OF PHOTOS, SEE FIGURE 1
LOCATED IN APPENDIX B

PHOTO NO. 1 - View of upstream face of dam and a portion of the reservoir from right abutment.

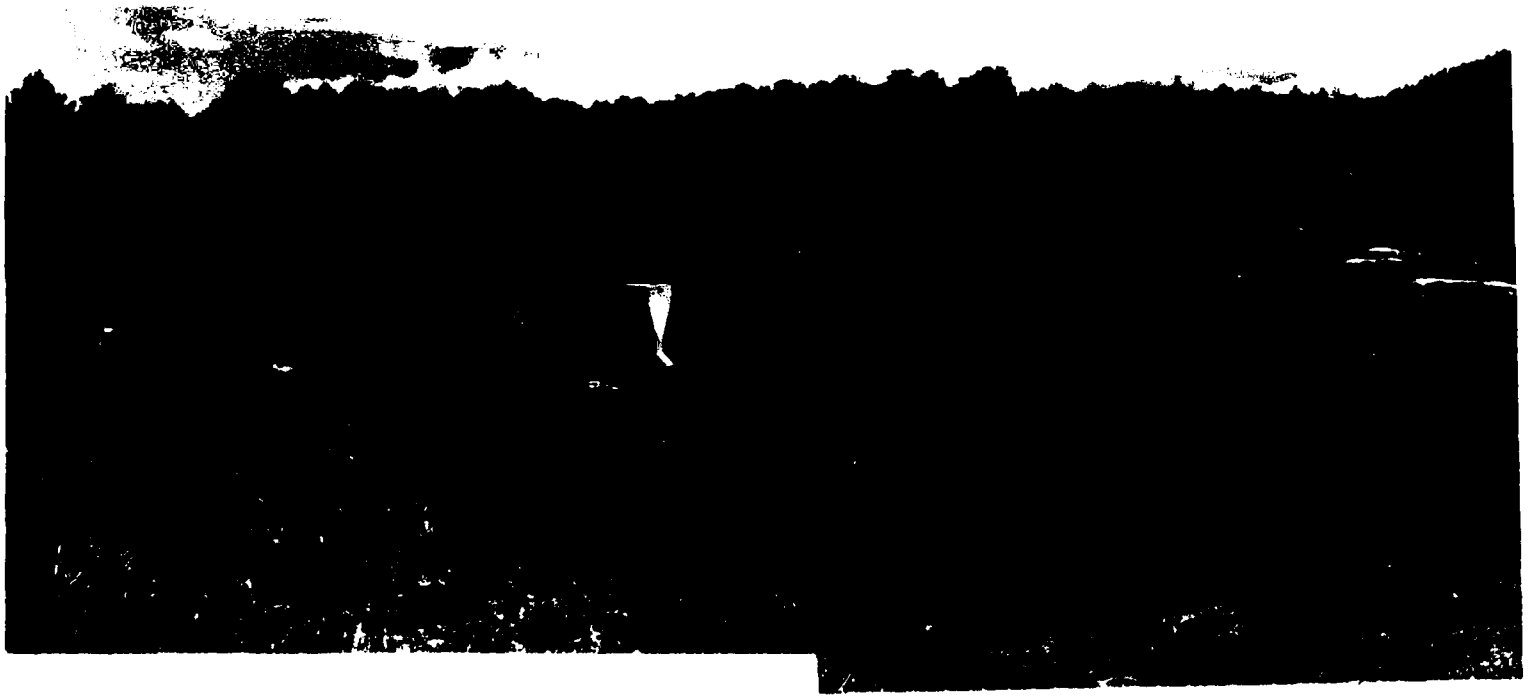


PHOTO NO. 2 - View of upstream face of dam from left abutment.

PHOTO NO. 3 - View of dam crest from left abutment.

PHOTO NO. 4 - View of downstream slope and rip-rap gutter looking toward right abutment.

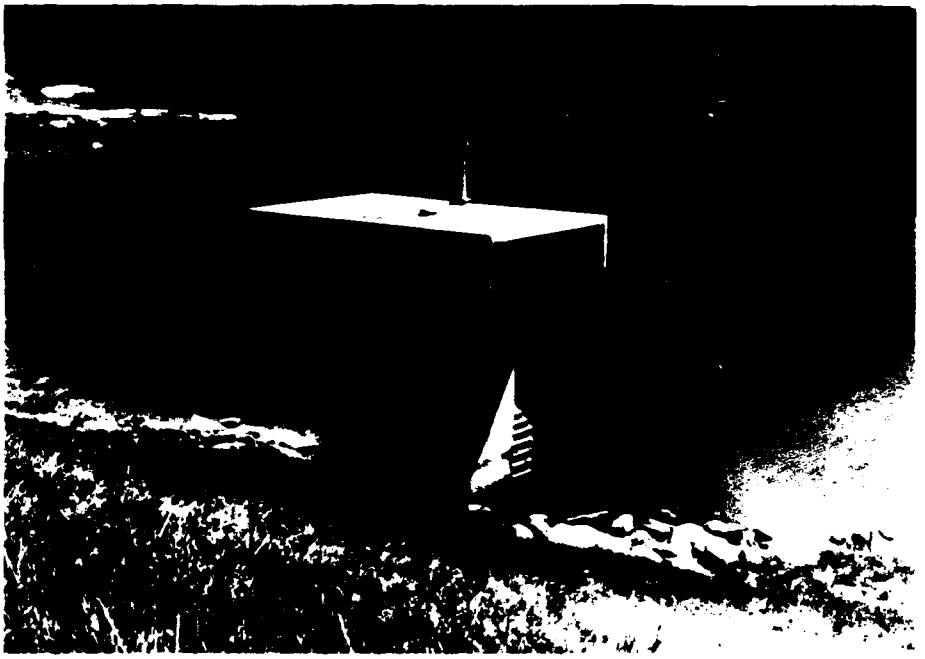


PHOTO NO. 5 - View of riser from dam.

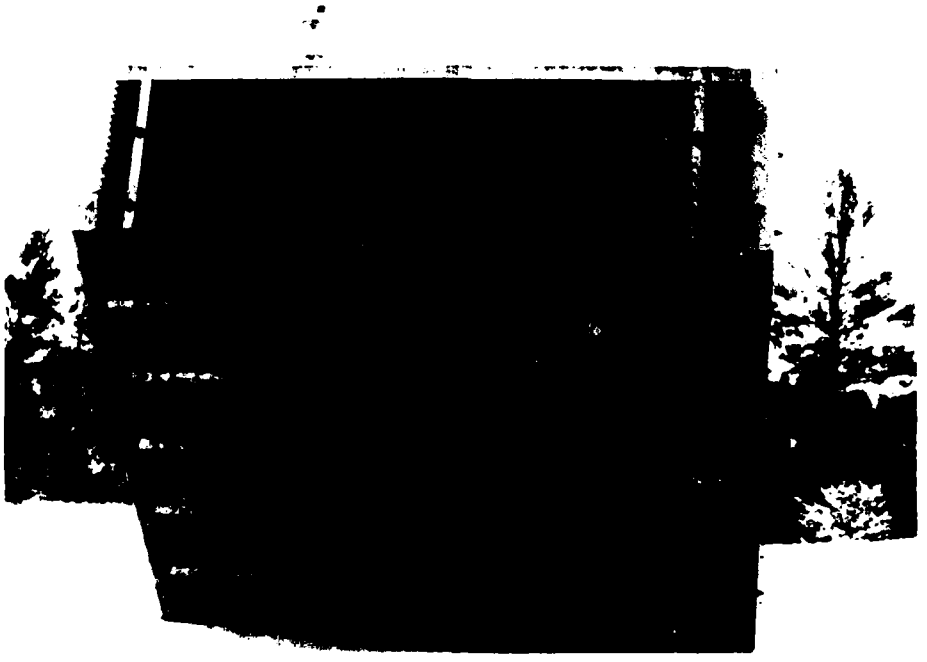


PHOTO NO. 6 - View of high stage trash rack.

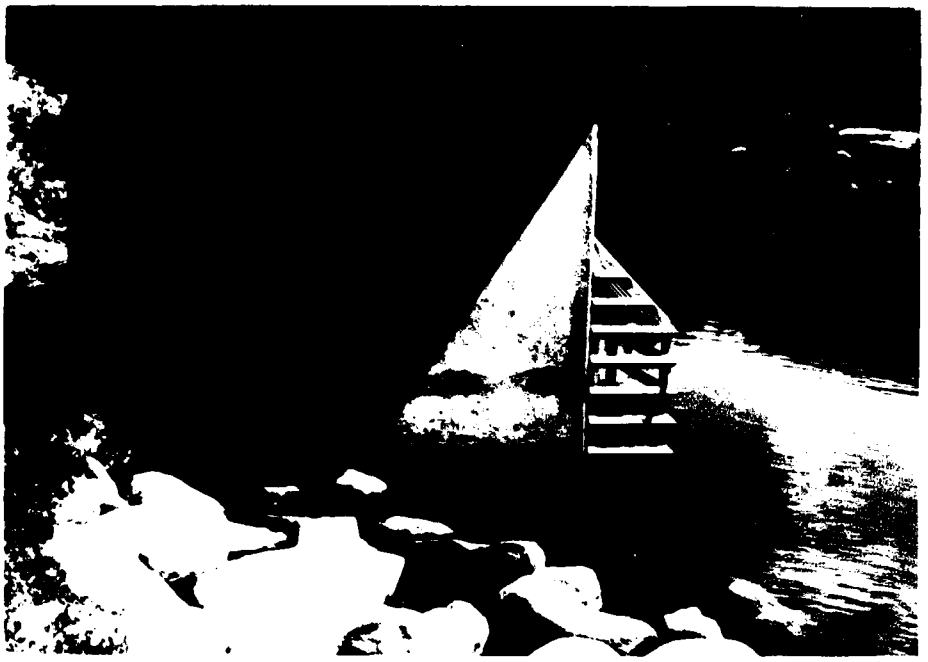


PHOTO NO. 7 - View of left side of riser.

PHOTO NO. 8 - Emergency earth spillway looking toward downstream end.

PHOTO NO. 9 - View of upstream end of emergency spillway.

PHOTO NO. 10 - View of wet areas in the emergency spillway, located near the axis of the dam.

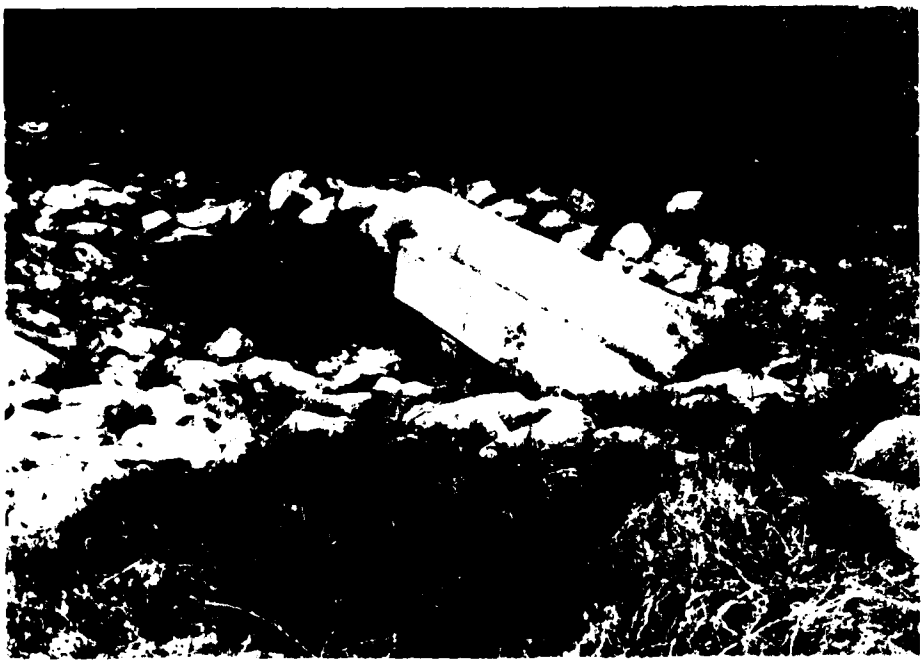


PHOTO NO. 11 - View of discharge area of emergency spillway.

PHOTO NO. 12 - View of concrete pipe principal spillway outlet and plunge pool.

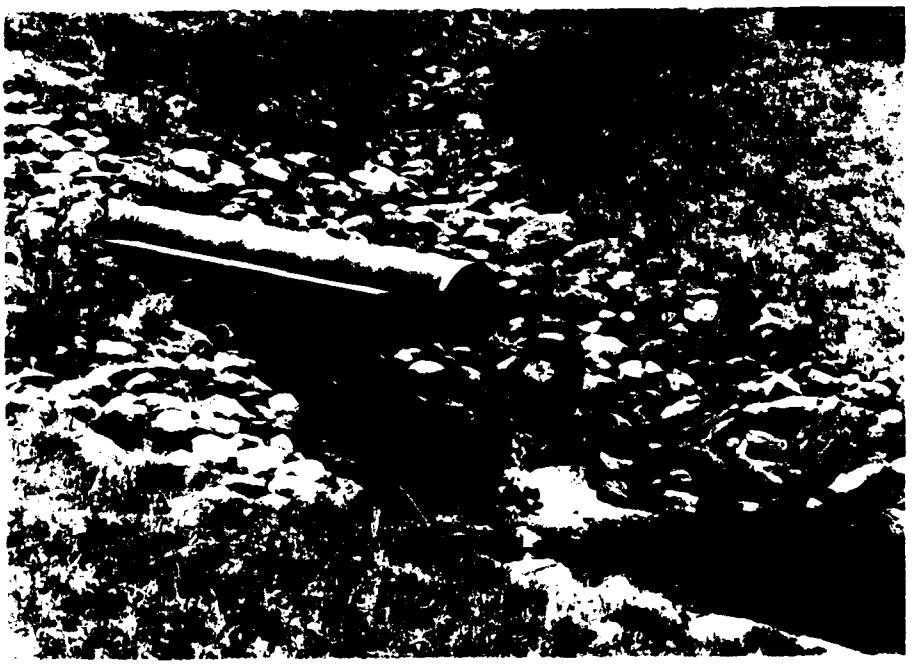


PHOTO NO. 13 - View of principal spillway outlet and portion of plunge pool.

PHOTO NO. 14 - View of outlet works and downstream face of dam.

PHTO NO. 15 - View of outlet works and downstream channel.

[illegible] 472372

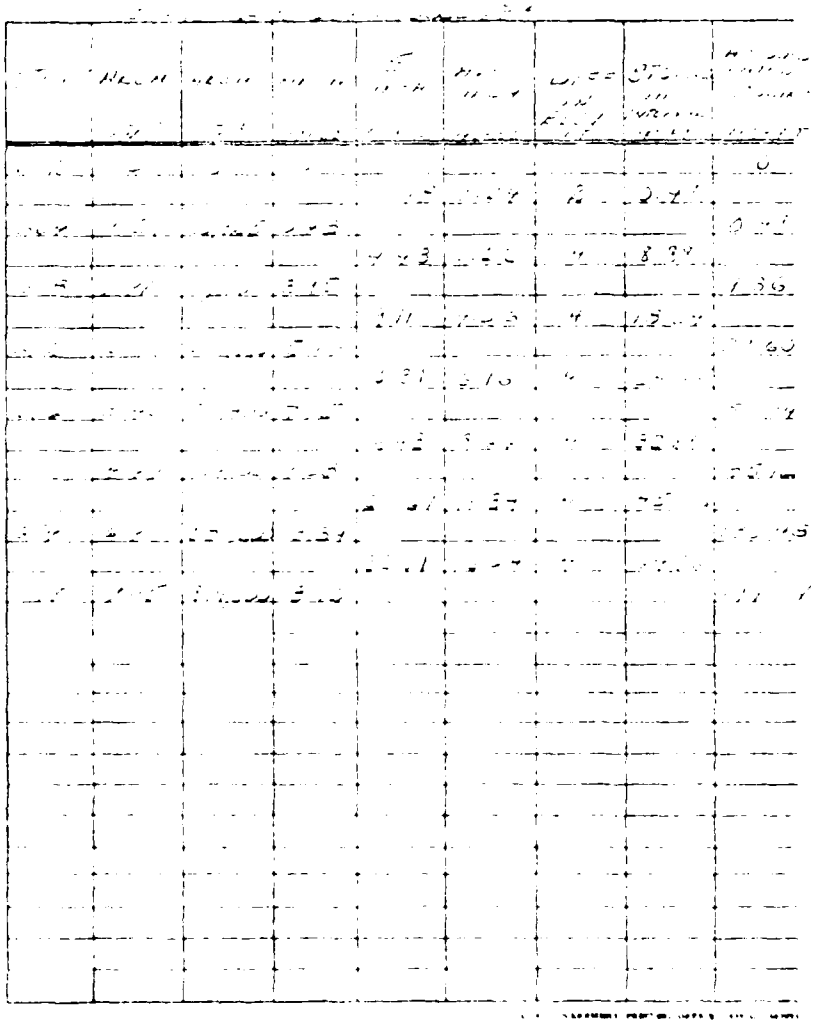
[illegible] = 1[illegible]

	[illegible]	[illegible]	[illegible]	OUTFLOW	[illegible]
	[illegible]	.	.	[illegible]	[illegible]
	[illegible]	.	.	0.	[illegible]
	[illegible]	.	.	0.	[illegible]
	[illegible]	.	.	[illegible]	[illegible]
	1.25	[illegible]	[illegible]	0.	667.00
	[illegible]	5.	[illegible]	0.	667.02
	1.75	[illegible]	21.	0.	667.14
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	2.25	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	477.	4.	670.72
	2.75	[illegible]	577.	6.	673.94
	3.00	1170.	1128.	7.	677.22
	3.25	[illegible]	1086.	39.	679.86
	3.50	811.	907.	170.	681.56
	3.75	669.	740.	303.	682.36
	4.00	567.	519.	402.	682.78
	4.25	512.	541.	452.	682.96
	4.50	[illegible]	481.	463.	683.00
PEAK	4.75	385.	417.	446.	682.94
	5.00	341.	363.	416.	682.83
	5.25	318.	328.	386.	682.72
	5.50	304.	310.	362.	682.61
	5.75	297.	300.	343.	682.53
	6.00	255.	291.	327.	682.46
	6.25	240.	255.	307.	682.38
	6.50	167.	203.	280.	682.24
	6.75	97.	132.	242.	682.03
	7.00	54.	76.	201.	681.80
	7.25	29.	41.	171.	681.57
	7.50	15.	22.	148.	681.35
	7.75	8.	12.	135.	681.14
	8.00	4.	6.	121.	680.87
	[illegible]	1.	3.	97.	680.45
	[illegible]	0.	1.	76.	[illegible]
	[illegible]	[illegible]	[illegible]	61.	[illegible]
	[illegible]	0.	0.	55.	[illegible]

VOLUME CHECK AT HP IS [illegible].10 PERCENT.
COMPUTED HP 2.50

Tabular Computations

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



Lower Euar Watershed - Site 11

NH-637

[illegible] Planned Data

Work [illegible] - Design Comparison	1
Emergency Spillway [illegible]	[illegible]
Emergency Spillway Freeboard Hydrographs [illegible]	[illegible]
[illegible]	[illegible]
[illegible] Inlet Channel	11 - 12
Emergency Spillway [illegible] & Exit Slope	13
[illegible]	[illegible] - 21

[illegible]		[illegible]	2.[illegible]
[illegible]		[illegible]	7.2
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	83[illegible]
[illegible]		[illegible]	71.[illegible]
[illegible]		[illegible]	6[illegible]
[illegible]		[illegible]	22
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	78
[illegible]		1101[illegible]	23 800
[illegible]		628.6	663.5
[illegible]		2[illegible]5	255
[illegible] ELEVATION		630.6	680.5
[illegible]		150	52
[illegible]		Earth(?)	Earth
[illegible]		1	<1
[illegible]		69	69
[illegible]	[illegible]	5.25	6.8
[illegible] RUNOFF	[illegible]	2.0	2.15
VELOCITY OF FLOW - V	FPS		
PEAK DISCHARGE RATE	CFS		
[illegible] WATER SURFACE EL	FEET	680.6	681.0
[illegible]	[illegible]	8.25	10.92
STORM RUNOFF	[illegible]	4.75	6.92
VELOCITY OF FLOW - V	FPS	[illegible]	[illegible]
[illegible] DISCHARGE RATE	CFS	[illegible]	[illegible]
[illegible] WATER SURFACE EL	FEET	[illegible]	[illegible]
[illegible]	FT	[illegible]	[illegible]
[illegible] LOW STAGE FLOW	CFS	[illegible]	[illegible]
[illegible] SIZE	FT		
[illegible] HIGH STAGE FLOW	CFS	[illegible]	[illegible]
PIPE SIZE	DIA	[illegible]	[illegible]
CAPACITY [illegible]			
TOTAL SEDIMENT VOL.	IN.	[illegible]23	[illegible]27
[illegible] STORAGE	IN.	2.85	2.85
[illegible] SPILLWAY STORAGE TO TOP OF DAM	IN.	[illegible]62	1.23
[illegible]	—		
[illegible] COSTS	—		

Figure 1

Step 4 Reach Outflow L_T = 2500 ft

Q_{P_1} = 32,700 cfs

Stage$_1$ = 17.1 ft area$_1$ = 1914 ft^2

$V_1 = \frac{1914 \times 1200}{43560} = 52.7 \leq \frac{125}{2}$

Reach OK

$Q_{P_2\ Trial} = 32700\left(1 - \frac{57.2}{125}\right) = 14,900$ cfs

Stage$_2$ = 13.9 ft area$_2$ = 1210 ft^2

$V_2 = \frac{1210 \times 1200}{43560} = 33.3$ acre ft

$V_{ave} = \frac{33.3 + 57.2}{2} = 45.3$ acre ft

$Q_{P_2} = 32700\left(1 - \frac{45.3}{125}\right) = 20,850$ cfs

---

Sub Incremental Reach 1 L = 1300 ft Q = 21,150 cfs

Stage$_1$ = 14.4 ft area$_1$ = 1310 ft^2

$V_1 = \frac{1310(1300)}{43560} = 39.1$ acre ft

$Q_{P_{Estimate}} = 29,860\left(1 - \frac{39.1}{125}\right) = 14,300$ cfs

Stage$_2$ = 12.5 ft area$_2$ = 954 ft^2

$V_2 = \frac{954 \times 1300}{43560} = 28.5$ acre ft

$V_{ave} = \frac{28.5 + 39.1}{2} = 33.8$ acre ft

$Q_{P_2} = 29,860\left(1 - \frac{33.8}{125}\right) = 15,200$ cfs

Stage$_2$ = 12.8 ft

HNTB HOWARD NEEDLES TAMMEN & BERGENDOFF	Made by RY	Date 5/25/77	Job No 5765-11-07
	Checked by [illegible]	Date [illegible]	Sheet No 5
For Baker # 11			

Estimate of Downstream Damage

Step 1 Reservoir Storage

At top dam elevation 673.5 feet
Storage 112 acre-ft

Step 2 Breach Outflow

$Q_{Breach} = 8/27 \sqrt{g}\, W_o\, Y_o^{3/2}$

W_o = 40% of dam length of 1x1 feet

Y_o = Height - streambed To Top of dam = 24 ft

Stream bed very small portion of valley section
use 17ft for Y_o = height - valley to Top of dam

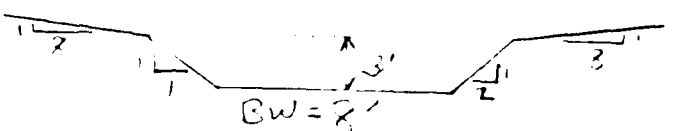
$Q_{Breach} = 8/27 \sqrt{g}\,(40)(1)(17)^{3/2} =$ 32,100 cfs

Spillway discharge 600 cfs

Total Discharge 32700 cfs

Step 3 Stage Discharge

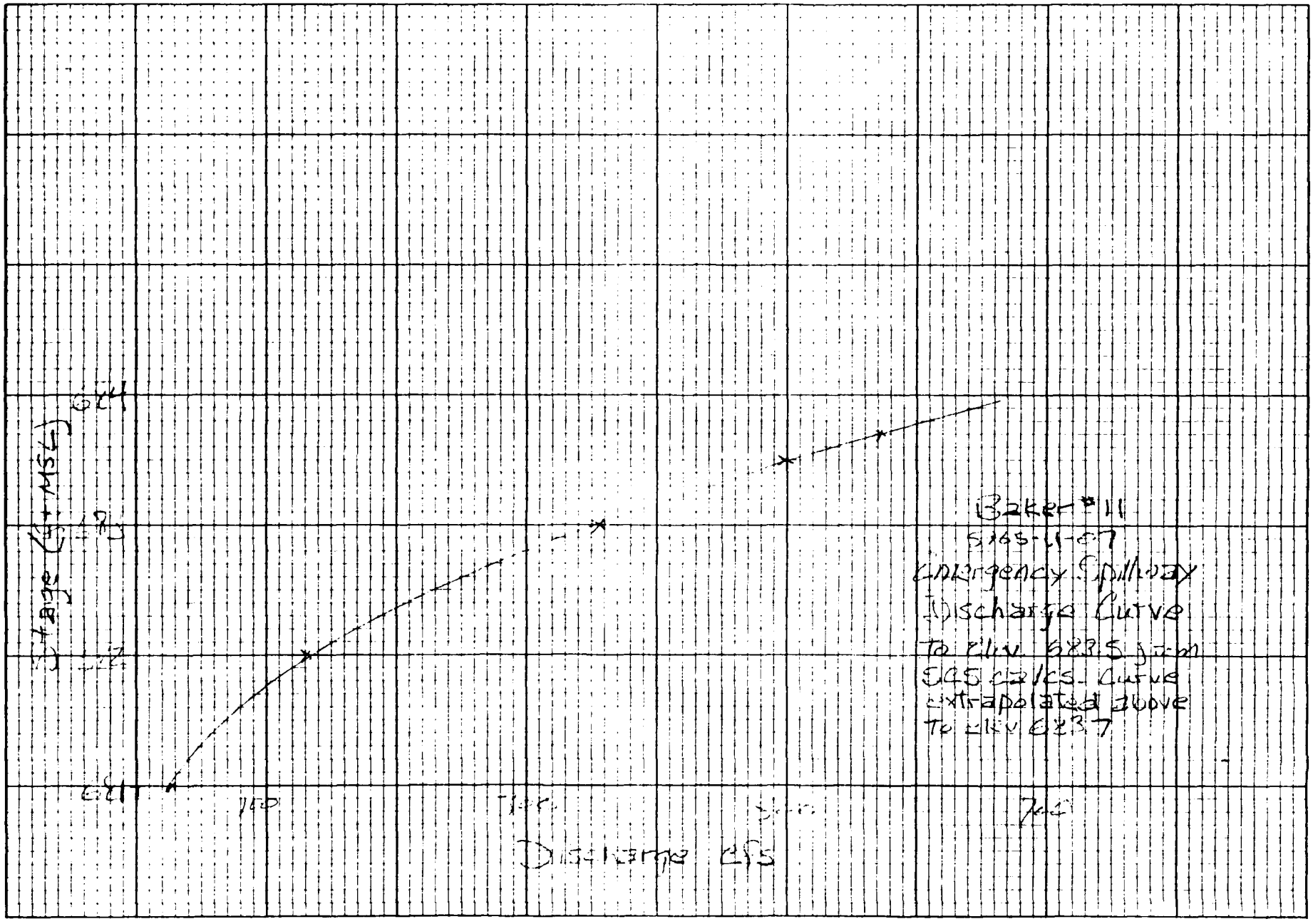
T.W. = 20'
n = .04

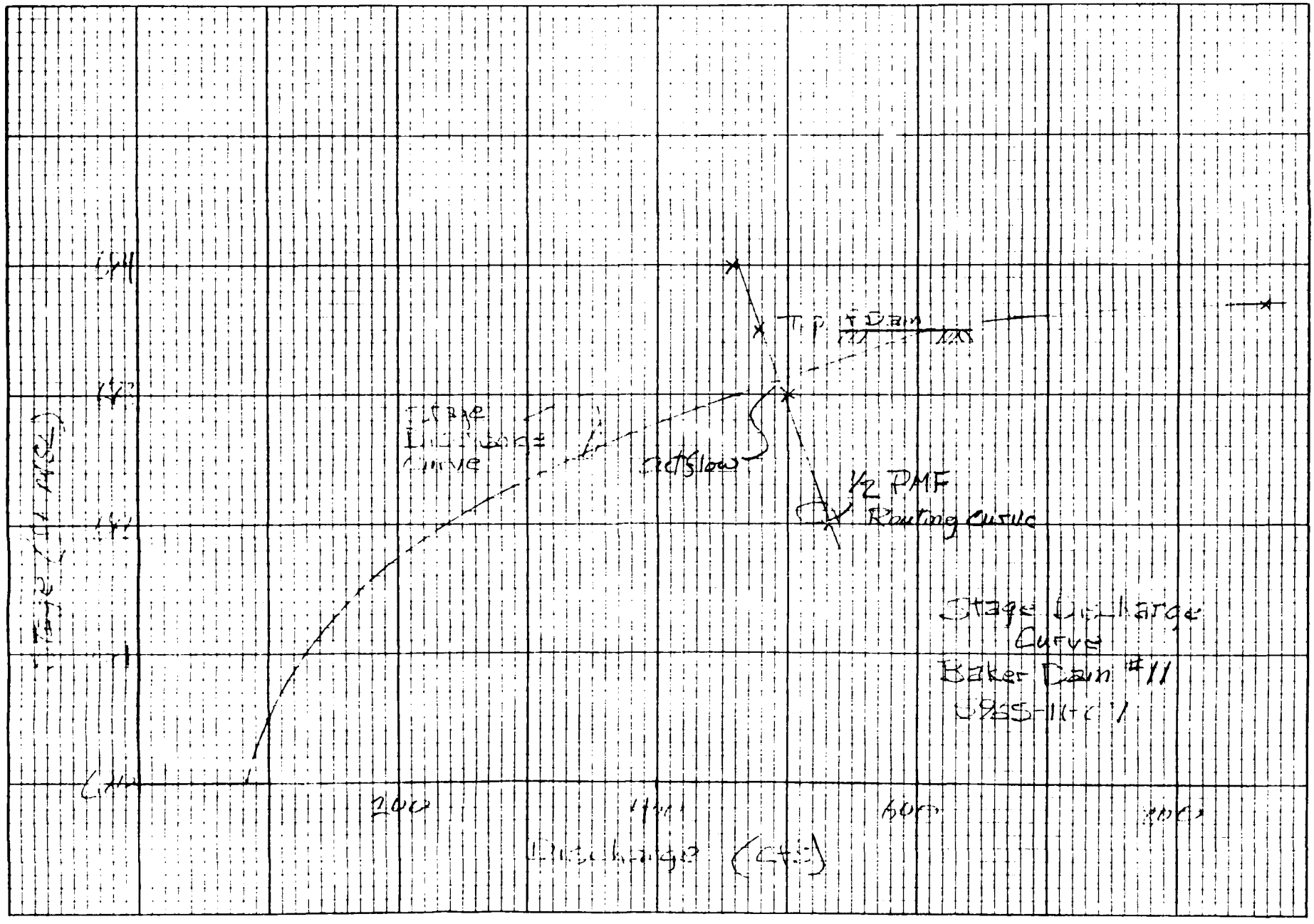


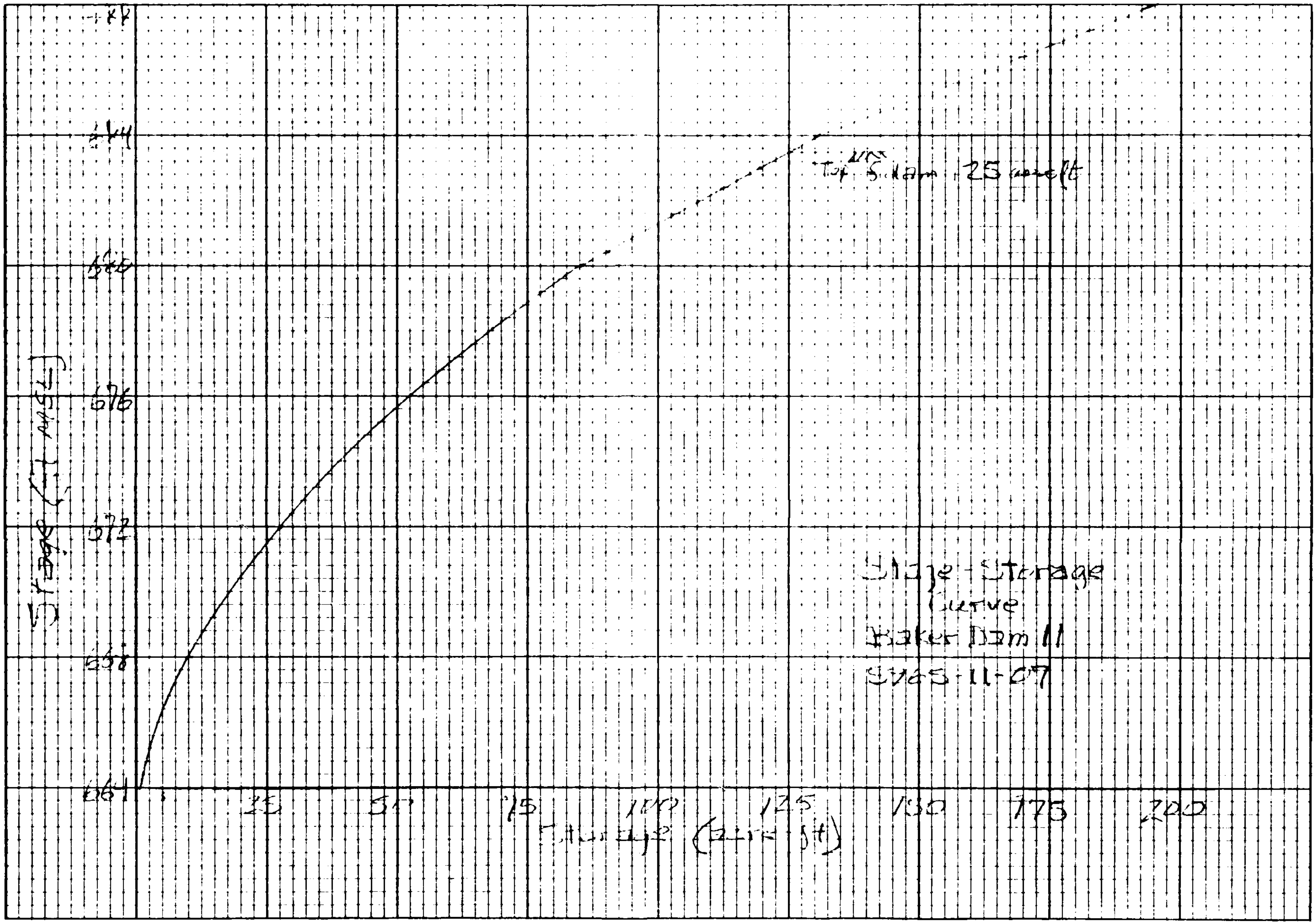
n = .08

Reach length = 2500'
Channel S = .0321
n_{ch} = .04
n_{OB} = .08

Stage	Discharge
5ft	1450 cfs
7	3210
9	6180
11	12,970
15	23,250
18ft	37,300


Baker #11
Emergency Spillway
Discharge Curve
To Elev 628.5 (USGS Calcs. Curve
extrapolated above
To Elev 628.7
Discharge (CFS)


½ PMF
Routing Curve
Stage Discharge
Curve
Baker Dam #11
USGS-HEC-1



Stage (ft msl)
664
668
672
676
680
684
688
Top Dam 25 acre-ft
25
50
75
100
125
150
175
200
Storage (acre-ft)
Stage-Storage
Curve
Baker Dam II
SVAS-11-07

HNTB HOWARD NEEDLES TAMMEN & BERGENDOFF	Made by RY	Date 6/20/79	Job No 5755-11-07
	Checked by HM	Date - - -	Sheet No 4
For Baker #11			

Step 3 Estimate of Surcharge - Storage Effect

Q_{P_1} = 425 cfs Runoff = 9.5 inches see page 2

$$Q_{P_2} = Q_R \times \left(1 - \frac{Stor}{9.5}\right)$$

- Q_R in acre-ft read from figure 1 — 8 acre-ft

$$Stor_{(in)} = \frac{Stor_{(acre\text{-}ft)} \times 12\ in/ft}{.55\ sq\ mi \times 640\ acres/sq\ mi} = .034\ (Stor)$$

Elev	Stor (acre-ft)	Stor (in)	Q_{P_2}
681	89	3.03	562
682	99	3.37	532
683	110	3.74	500
683.5	117	3.98	479
684	124	4.22	459

See figure 2 for plot and final outflow

From figure 2 Outflow 495 cfs

Stage 683.1

Freeboard 0.4 ft

HNTB HOWARD NEEDLES TAMMEN & BERGENDOFF	Made by RY	Date 6/20/79	Job No 5765-11-07
	Checked by [illegible]	Date [illegible]	Sheet No 3

For Baker #11

Step 2 Calculation of Test Flood Surcharge

Stage - Discharge Curve

Elev.	ft above Emer. Spillway	A Riser Pipe Flow	B Emer. Spillway	C Crest of Dam	Total
680.5	0	77 cfs	0		77 cfs
681		121	27 cfs		123
682		104	131		235
683		106	355		461
683.5		107	[illegible]	0	607
683.7		108	570*	188 cfs	866

A From Bear Creek Dam #11 [illegible]
See copies of calcs. at the end of this section.

B. Same as A

* See Figure 2

C Computed as flow over a broad-crested weir

$Q = CLH^{3/2}$

$C = 3.09$

$L = 681$

$Q = 2104\ H^{3/2}$

See figure 2 for plot

HNTB HOWARD NEEDLES TAMMEN & BERGENDOFF	Made by RY	Date 6/20/79	Job No 5765-11-07
	Checked by [illegible]	Date [illegible]	Sheet No 2

For Baker #11

Step 1 Calculation of Test Flood Inflow

Classification: Size: Small
Hazard: Significant

Hydrologic Evaluation Guidelines Recommends

100 yr freq flood to 1/2 PMF for Test Flood

use 1/2 PMF as hazard classification is on higher side of significant 2 dwellings + road affected

Use Mountainous curve PMF = 3000 csm (Minimum value recommended)

Test Flood Inflow = 1/2 × 3000 csm × .55 sq mi
= 825 cfs

As this is a flood control [illegible] the portion of the storage above the normal pool can be used for storage of a portion of the Test Flood Inflow

1 acre-ft normal pool
70 acre-ft at crest of emergency spillway
82 acre-ft available for TFI storage

Volume of 1/2 PMF = 19"/12"/ft × 1/2 × 640 ac/mi² × .55 mi²
= 279 acre-ft

HNTB HOWARD NEEDLES TAMMEN & BERGENDOFF	Made by RY	Date 5/20/79	Job No 5765 11-07
	Checked by -1	Date - -	Sheet No 1
For Baker Dam Site #11			

Hydraulics and Hydrology

Baker River Dam Site 11 Located on a tributary to the Baker River in the Town of Wentworth, N.H. in the Merrimack River Basin.

Classification Size: Small
Hazard: Significant

Basic Data D.A. = 5.55 sq.mi.
Upstream Dam Mountainous
200 ft/mile

Reservoir: Recreation Pool = elev. 609.0
Storage: 4 acre-ft
Inlet Spillway Crest elev. 605
Storage 20 acre-ft
Top of Dam elev. 613.5
Storage 125 acre-ft

Dam: Earth
Length: 611 ft
Height 24 ft

Spillways
Riser crest 579.12
Weir length 15 feet
Emergency Spillway: elev. 610.5 ft
Width 50 ft.

See Appendix B for Plan of Dam

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

[illegible] DESIGN AND [illegible] ROUTING

NEW HAMP. [illegible] [illegible] 4/23/70

[illegible] NO. [illegible] 1 [illegible] STORM DURATION 6.00

EMER. SPW. RAINFALL [illegible] FREEBOARD RAINFALL 10.90

CASE NO. 1. DRAINAGE AREA 0.52 EMER. SPW. CREST [illegible]

BCI 50. [illegible] 199. 802 0. L2 0. [illegible] 0. L3 0.

ELEVATION	STORAGE	CFS	CFS	CFS
[illegible]	[illegible]	[illegible]	0.	0.
[illegible]	17.	[illegible]	0.	0.
[illegible]	45.	7.	0.	0.
679.12	77.	8.	0.	0.
679.80	84.	[illegible]	0.	0.
680.37	90.	74.	0.	0.
[illegible]	91.	[illegible]	0.	0.
680.50	91.	[illegible]	0.	0.
680.95	93.	[illegible]	0.	0.
[illegible]	[illegible]	[illegible]	0.	0.
[illegible]	[illegible]	[illegible]	0.	0.
681.82	104.	[illegible]	0.	0.
682.00	107.	[illegible]	0.	0.
682.10	[illegible]	[illegible]	0.	0.
682.37	111.	304.	0.	0.
682.59	114.	395.	0.	0.
682.80	117.	405.	0.	0.
683.00	120.	461.	0.	0.
683.16	122.	[illegible]	0.	0.
683.49	127.	[illegible]	0.	0.

TIME	INFLOW	AVG FLOW	OUTFLOW	ELEV.
[illegible]	[illegible]	[illegible]	0.	665.99
[illegible]	[illegible]	[illegible]	0.	665.99
[illegible]	0.	0.	0.	665.99
[illegible]	0.	0.	0.	665.99
[illegible]	0.	0.	0.	665.99
1.50	0.	0.	0.	665.99
1.75	0.	0.	0.	665.99
[illegible]	0.	0.	0.	665.99
[illegible]	61.	30.	0.	667.23
2.50	219.	141.	1.	667.98
2.75	405.	311.	3.	669.63
3.00	471.	437.	4.	671.35
3.25	423.	447.	5.	672.98
3.50	354.	389.	6.	674.39
3.75	301.	328.	7.	675.42
4.00	263.	282.	7.	676.15
4.25	242.	252.	7.	676.50
4.50	219.	228.	7.	677.39
4.75	188.	201.	8.	677.90
5.00	167.	177.	8.	678.35
5.25	156.	161.	8.	678.76
5.50	151.	153.	9.	679.14
[illegible]	136.	150.	20.	679.43
6.00	134.	146.	30.	677.69
6.25	121.	132.	41.	679.39
[illegible]	89.	109.	47.	680.00
6.75	47.	66.	51.	680.03
PEAK 7.00	27.	38.	49.	680.01
7.25	14.	21.	46.	679.96
7.50	8.	11.	41.	679.89
7.75	4.	6.	37.	679.83
[illegible]	[illegible]	[illegible]	34.	679.78
[illegible]	0.	1.	31.	679.69
[illegible]	0.	0.	29.	679.63
[illegible]	0.	0.	27.	679.57
[illegible]	0.	0.	26.	679.52

NO EMERGENCY SPILLWAY FLOW. NO FURTHER ROUTINGS MADE.

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTITY NUMBER	DIVISION	STATE	COUNTY	CONGR DIST	STATE	COUNTY	CONGR DIST	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY	MO	YR
NH	478	NED	NH	009	02				BAKER FLOODWATER RESE-VOIR SITE II	4351.9	7154.0	27	JUL	79

POPULAR NAME	NAME OF IMPOUNDMENT
	BAKER FLOODWATER RESERVOIR SITE II

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	(MI) FROM DAM	POPULATION
01	05	TRIBUTARY BAKER RIVER	WENTWORTH	1	376

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT)	HYDR. HEIGHT (FT)	IMPOUNDING CAPACITIES MAX. (ACRE FT)	NORMAL (ACRE FT)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
REPG	1971	C	30	2	125	8	NED	N	N	N	B	

REMARKS

U.S. HAS	SPILLWAY CREST LENGTH	SPILLWAY TYPE	SPILLWAY WIDTH (FT)	MAXIMUM DISCHARGE (FT)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO.	LENGTH (FT)	WIDTH (FT)	LENGTH (FT)	WIDTH (FT)	LENGTH (FT)	WIDTH (FT)	LENGTH (FT)	WIDTH (FT)
2	681	U	80	607	28326											

OWNER	ENGINEERING BY	CONSTRUCTION BY
N H WATER RESOURCES BD	SOIL CONSERVATION SER	ROBIE CONSTRUCTION CO

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

INSPECTION BY	INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
HOWARD NEEDLES TAMMEN BERGENDOFF	17	MAY	79	PUBLIC LAW 92-367 AUG 1972

REMARKS

END

FILMED

9-85

DTIC